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TECHNICAL MANUAL FOR

INTERVIEW® 4600

Atlantic Research Corporation
Teleproducts Division
7401 Boston Boulevard, Springfield, Virginia 22153

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1. INTRODUCTION: USING THIS MANUAL

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PRIMARY DATA
PRIMARY HARDWARE
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SECONDARY HARDWARE
CLOCKS
INTERVIEW STATUS
CRT
CONTROL
CAPTURE MEMORY
CONTROL
3M
INTERVIEW

1

INTRODUCTION: USING THIS MANUAL

The INTERVIEW 4600 is a powerful data communications monitor, recorder, and interactive test instrument. Because it is completely controlled by menu selections in clear text, it requires no special programming skills or language, which makes it both powerful and simple to use.

The INTERVIEW 4600 can be used for more than troubleshooting. As a network monitor, it can obtain valuable data to improve system efficiency. As an emulator, it can test new equipment before installation. And as a training device, it can teach new employees the dynamic characteristics of the network and expose them to a variety of system troubles before they start work on the real system.

The more you know about your network and protocol, the more satisfaction you will get from using the INTERVIEW 4600 to its fullest. This manual, then, is only part of the story. Your knowledge of your system and your imagination are key ingredients of success with the INTERVIEW 4600.

We have organized this technical manual so that you need use only the portions of the manual that you want for the level at which you are using the instrument. There is a thorough subject index at the end of the volume, which you should find convenient as your proficiency with the INTERVIEW 4600 develops.

Many of the illustrations are video prints from the 4600 CRT input. We have used negative images because they give much better definition on the printed page.

Section 2, General Description, is descriptive only: it includes no operating instructions or other information essential for operating the instrument. Nevertheless, most readers will find it is very valuable orientation.

Section 3, Before Power-up, contains information that is essential if you are using the 4600 for the first time or if you should want to change power source or data source.

Sections 4 through 6, on Status Indicators and the Keyboard, cover in detail two means of operator interaction with the instrument. These three sections will take on more significance, and you will probably find yourself referring to them in more depth, after you have developed basic operating skills.

Section 7 explains how to power up your unit for monitoring either line data or taped data or for interactive operation. Sections 8 through 10 cover all Run Mode capabilities except for the specialized displays for X.25 and SDLC.

All the basic parameters that must be selected in order to use the INTERVIEW 4600 can be found on one menu, Parameters 1. These parameters are explained in Sections 11 through 15. Section 14 also explains the special BCC Parameters menu, which allows you to define block check calculations to match your system.

Section 16 discusses how to select simple CRT Enhancements with the CRT Control menu on the Parameters 2 display.

The triggers are explained in Sections 17 through 21. Since all measurements, interactive operation, and many CRT enhancements are under trigger control, these sections are the core of this manual. Thorough understanding of the triggers is essential for effective use of the 4600, so read these sections before you attempt interactive operation or specialized applications such as bit-oriented protocols.

Sections 22 through 26 explain the data recording and program storage capabilities of the 4600's integral tape. The optional high-speed data memory (RAM) is also explained in these sections because it is most powerful when used in conjunction with the tape. The 4600 can print data or its own programs to an ASCII printer, as explained in Section 27. Section 37 contains procedures for remote transfer of tape recorded data to or from other INTERVIEWs (programs may be transferred also).

Sections 28 through 31 are about Interactive Testing: they contain the essential information and instructions for transmitting with the 4600. You should learn to operate your unit as a monitor and to use the trigger menus before you try interactive operation.

Section 32 is about high-speed monitoring; it will be of interest only for data speeds above 19.2 kbps.

The 4600 has a number of special features for monitoring and testing systems that use bit-oriented protocols. This information is brought together in Sections 33 through 35 for your convenience, but the necessary, basic information for operating and programming the 4600 must still be found in other sections of the manual. Instructions for the specialized 4600 software available for DDCMP are included in Section 36.

Further technical and service information will be found in the Appendixes.

2. GENERAL DESCRIPTION OF THE INTERVIEW 4600

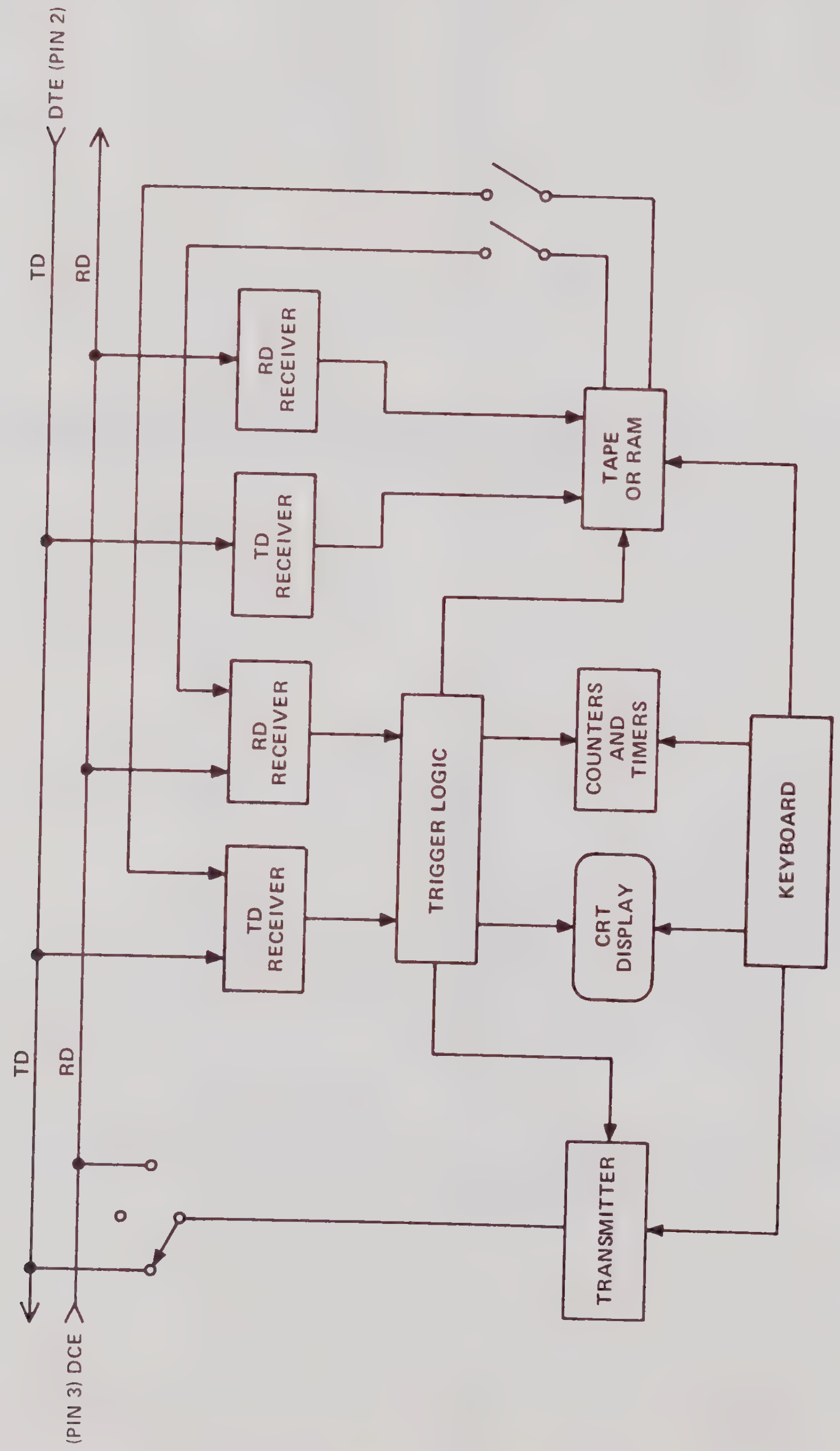

DTE (PIN 2)
TD
RD
RD RECEIVER
TD RECEIVER
RD RECEIVER
TD RECEIVER
TAPE OR RAM
TRIGGER LOGIC
COUNTERS AND TIMERS
CRT DISPLAY
KEYBOARD
TRANSMITTER
TD
RD
(PIN 3) DCE

Figure 2-1

2

GENERAL DESCRIPTION OF THE INTERVIEW 4600

The INTERVIEW 4600 is really four independent instruments in one:

(1) A simple real-time data display that you can control from the keyboard. Selected data can be highlighted or suppressed from the display. You can program more sophisticated CRT control if you wish.

(2) A programmable diagnostic analyzer for network performance measurements. Eight counters and two timers are under program control of 16 nonsequential triggers.

(3) An automatically controlled program and data recorder. Self-documenting integral tapes store the program in a protected area and record data as well as RS-232/V.24 interface lead status. High-speed memory options are available to augment the tape. Up to 100 programs can be stored on a single program-only tape. Programs and data may be printed out on most asynchronous ASCII printers.

(4) An Emulator. When the 4600 transmits, it controls the RS-232/V.24 interface leads to emulate a terminal or CPU transmitting through DTE or DCE.

The INTERVIEW 4600 is programmed entirely with self-prompting menus. When you power up the unit, it leads you through all the necessary steps to monitor data in any one of eight codes and six data formats, offering at any point in the process only selections relevant to your previous choices. The same method is used for controlling the CRT, counters and timers, transmitter, RS-232/V.24 interface, and recording.

Figure 2-1 is a simplified functional diagram of INTERVIEW 4600 operation. The instrument contains three Z-80 microprocessors. Each microprocessor operates independently and is supported with its own ROM, RAM, and input-output interfaces. Operation has been further simplified by assigning each microprocessor independent tasks: One controls the CRT display and keyboard; the second is actively looking for triggers and handling the real-time statistical performance monitoring operations; and the third controls the tape and the optional high-speed memory.

Although the logical power of the three microprocessors controls the CRT, counters and timers, and data recording, you can override the trigger program from the keyboard without leaving Run Mode, and just as easily restore trigger control.

The 4600 has separate RD and TD receivers for the Capture Memory (tape and RAM option) and for the trigger logic. When the tape or RAM is played back, it sends its data directly to the trigger logic receivers and hence to the CRT buffer and counters and timers.

3. BEFORE POWER-UP

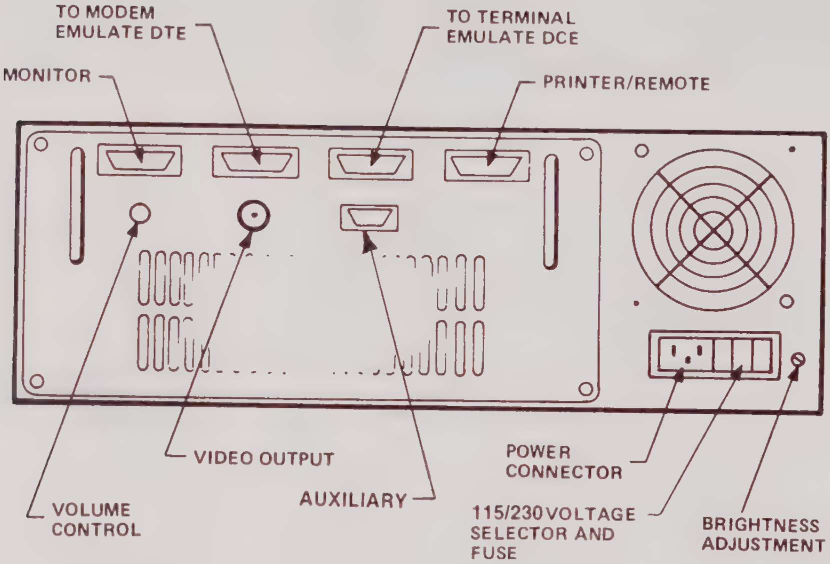


Figure 3-1 Rear Panel of Interview.

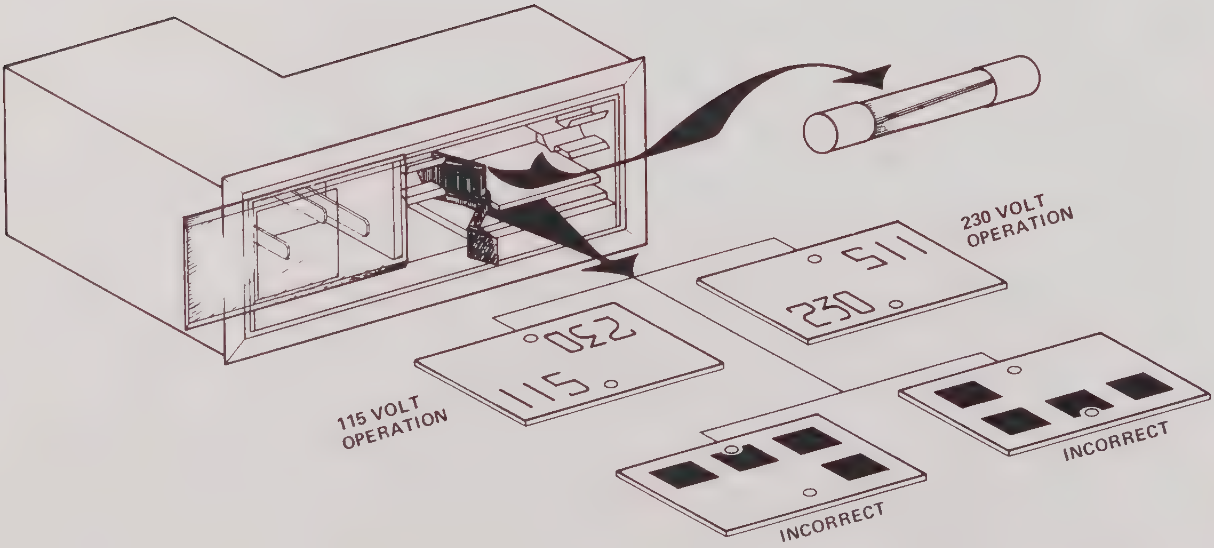


Figure 3-2 Voltage Selector.

3
BEFORE POWER-UP

3.1 UNPACKING THE INTERVIEW 4600

As each item is unpacked from the carton, inspect it for obvious mechanical damage. Check the pockets in the packing caps for cables, manuals, and so forth. Retain the original packing material for future reshipment, as it has been designed for maximum protection.

Check the received items against the shipping list.

CAUTION: Do not connect the INTERVIEW to power until you have checked the line voltage selector in accordance with Section 3.2.

3.2 LINE VOLTAGE SELECTOR

The voltage selector and the power connector are part of the ac filter assembly on the right side of the rear panel of the instrument (see Figures 3-1 and 3-2). Slide the transparent window to the left. The line voltage selector card can be seen at the bottom of the window with the present voltage selection visible -- and right side up.

The INTERVIEW 4600 is designed to operate at 95 to 130 V ac, 50 or 60 Hz when 115 V is selected; or from 190 to 260 V ac, 50 or 60 Hz when 230 V is selected.

NOTE: The frequency must be selected separately (see Section 3.3).

To change the line voltage selection, swing the fuse extractor handle labeled FUSE PULL out toward the left and remove the fuse. The voltage selector card can then be removed and rotated so that the correct line voltage can be read in the window. When the voltage selector card has been seated correctly, push the fuse extractor handle in and replace the fuse.

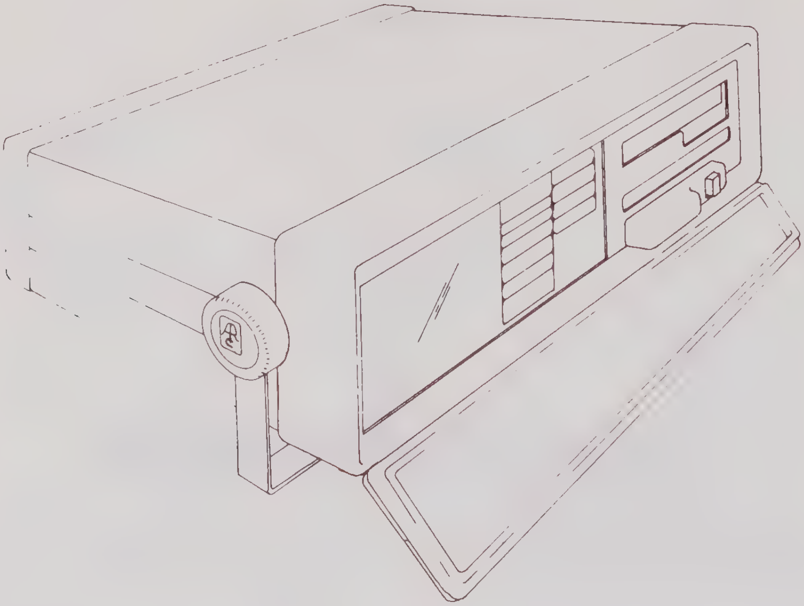


Figure 3-3

3.3 POWER FREQUENCY SELECTION

An internal switch gives a choice between 50- and 60-Hz operation. It is factory-set for the customer's environment. If the unit should fail to operate properly, please consult Appendix J.4 for instructions on this setting.

3.4 MIL-188 SELECTION

MIL-188 operation may be chosen on the Parameters 1 menu after power-up (see Section 15.1).

3.5 ASYNCHRONOUS OPERATION

The number of stop bits (one or two) in asynchronous operation is selected with an internal DIP switch. See Appendix J.4 for instructions.

3.6 SETUP

Slide the window on the power connector to the right to expose the connector pins, and connect the power cord to the INTERVIEW.

Rotate the handle to the position shown in Figure 3-3 by pressing inward on the handle pivots while you rotate the handle. Release pressure on the pivots and, if necessary, move the handle until the detents lock in place.

Open the front panel by lifting up the rear edge of the black latch and pulling it forward.

> *WARNING: Be sure to connect the INTERVIEW only to a properly grounded power source.*

Connect the power cord to a third-wire ground power source. The power cord supplied has a third protective ground wire connected to the chassis.

> *CAUTION: When you power up the instrument (Section 6), be sure that the fan in the rear runs.*

3.7 DATA CONNECTORS

On the rear of the unit, as shown in Figure 3-1, are four standard RS-232/V.24 data connectors.

There is one MONITOR connector. For passive monitoring, connect this connector to the line in both directions using the ribbon T-cable supplied with the INTERVIEW, or using your patch system.

Please read Sections 28 and 29 before you connect either of the EMULATE connectors to your system. The EMULATE DTE (TO MODEM) connector is used in Emulate DTE Mode to transmit on TD and receive on RD. The EMULATE DCE (TO TERMINAL) connector is used in Emulate DCE Mode to transmit on RD and receive on TD.

The fourth RS-232 connector (labeled PRINTER/REMOTE) is intended only for certain special functions, which are explained in Sections 27 and 37.

To monitor data played back from the INTERVIEW's integral tape, see Section 23.

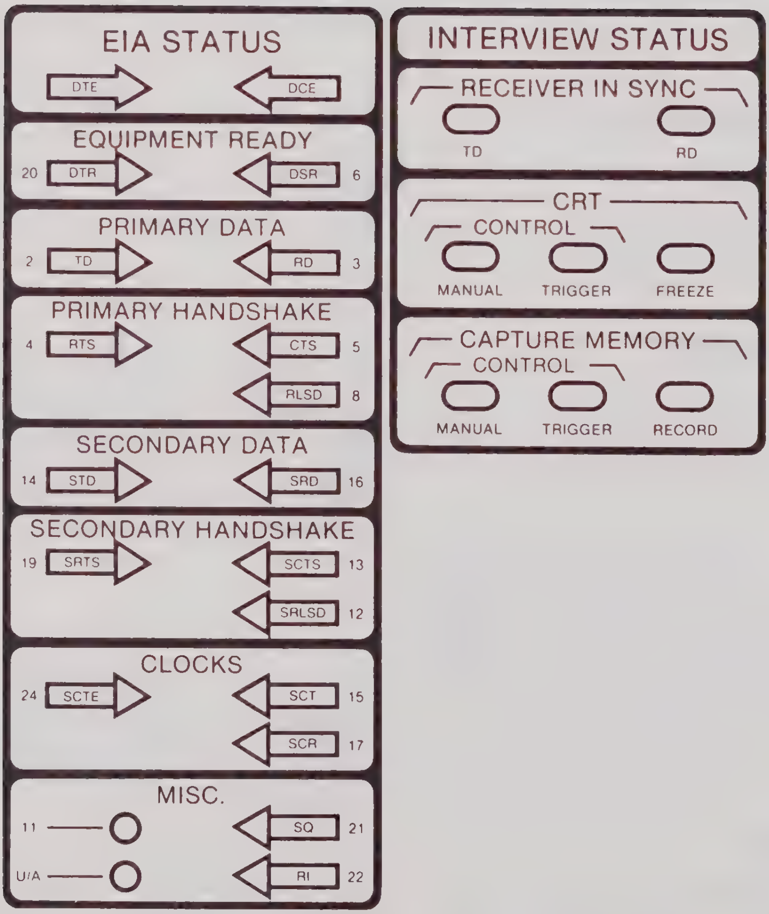

EIA STATUS
DTE
DCE
EQUIPMENT READY
20 DTR
DSR 6
PRIMARY DATA
2 TD
RD 3
PRIMARY HANDSHAKE
4 RTS
CTS 5
RLSD 8
SECONDARY DATA
14 STD
SRD 16
SECONDARY HANDSHAKE
19 SRTS
SCTS 13
SRLSD 12
CLOCKS
24 SCTE
SCT 15
SCR 17
MISC.
11
U/A
SQ 21
RI 22
INTERVIEW STATUS
RECEIVER IN SYNC
TD
RD
CRT
CONTROL
MANUAL
TRIGGER
FREEZE
CAPTURE MEMORY
CONTROL
MANUAL
TRIGGER
RECORD

Figure 4-1

4

RS-232/V.24 STATUS INDICATORS

On the front panel of the INTERVIEW 4600 (see Figure 4-1) are two groups of Light-Emitting Diode (LED) status indicators. The left side of the status panel, headed EIA STATUS, displays the status of the data and control leads on the RS-232/V.24 interface.

There are specific indicators for 17 RS-232/V.24 data, clock, and control leads. In addition, there is an indicator for Pin 11 and one other, labeled U/A (User Assignable; see Appendix J.5) that you can assign to any lead. Thus, the status of any data, clock, or control lead defined by the RS-232/V.24 standard can be observed.

The EIA STATUS display is arranged to identify the source of each signal and to group corresponding signals. In the left-hand column, headed DTE (Data Terminal Equipment), are the indicators for signals from the DTE; in the right-hand column, headed DCE (Data Communication Equipment), the indicators for signals from the DCE.

Below these headings the indicators are grouped logically by function, as shown in Table 4-1.

The EIA status LEDs are ON for input voltages greater than approximately +3 V; that is, for control leads in the ON state or data leads in the space state. When the data source is line, they are all active. When the source is tape, and EIA lead status has been recorded, the TD, RD, DTR, DSR, RTS, CTS, RI, RLSD, SCT, SCR, and U/A indicators are active; but if EIA lead status has not been recorded, then only TD, RD, SCT, and SCR are active.

TABLE 4-1

EIA STATUS PANEL

DTE	DCE
EQUIPMENT READY Group	
Pin 20, DTR: Data Terminal Ready EIA = CD CCITT = 108.2	Pin 6, DSR: Data Set Ready EIA = CC CCITT = 107
PRIMARY DATA Group	
Pin 2, TD: Transmitted Data EIA = BA CCITT = 103	Pin 3, RD: Received Data EIA = BB CCITT = 104
PRIMARY HANDSHAKE Group	
Pin 4, RTS: Request to Send EIA = CA CCITT = 105	Pin 5, CTS: Clear to Send EIA = CB CCITT = 106
	Pin 8, RLSD: Received Line Signal Detect (Carrier Detect) EIA = CF CCITT = 109
SECONDARY DATA Group	
Pin 14, STD: Secondary Transmitted Data EIA = SBA CCITT = 118	Pin 16, SRD: Secondary Received Data EIA = SBB CCITT = 119
SECONDARY HANDSHAKE Group	
Pin 19, SRTS: Secondary Request to Send EIA = SCA CCITT = 120	Pin 13, SCTS: Secondary Clear to Send EIA = SCB CCITT = 121
	Pin 12, SRLSD: Secondary Received Line Signal Detect EIA = SCF CCITT = 122

(continued)

TABLE 4-1 (cont.)

DTE	DCE
CLOCKS Group	
Pin 24, SCTE: Serial Clock Terminal Source EIA = DA CCITT = 113	Pin 15, SCT: Serial Clock Transmit EIA = DB CCITT = 114
	Pin 17, SCR: Serial Clock Receive EIA = DD CCITT = 115
MISC. Group	
Pin 11: Originate Mode EIA = CY CCITT = 126/127	Pin 21, SQ: Signal Quality Detector EIA = CG CCITT = 110
Select transmit frequency or select receive frequency; used in BELL 103F-Type Data Sets.	Pin 22, RI: Ring Indicator EIA = CE CCITT = 125
U/A: User Assigned May be connected to any control lead (see Appendix K.5 for strapping instructions). The U/A indicator is then assigned to the strapped pin, and if interface status is recorded, its status will be recorded and displayed during playback.	

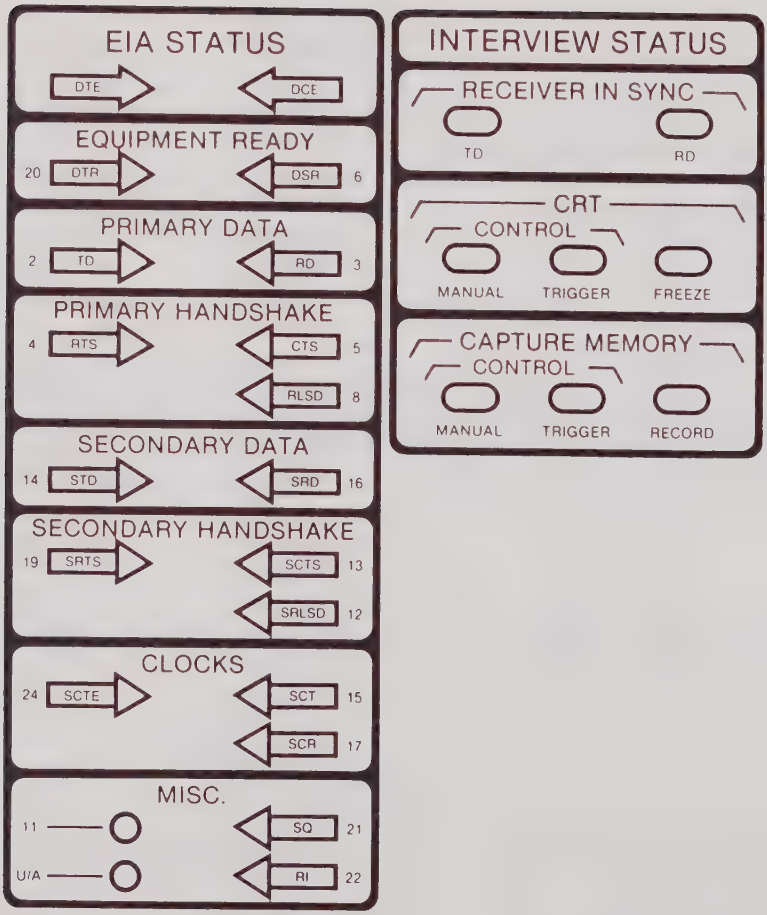

EIA STATUS
DTE
DCE
EQUIPMENT READY
20
DTR
DSR
6
PRIMARY DATA
2
TD
RD
3
PRIMARY HANDSHAKE
4
RTS
CTS
5
RLSD
8
SECONDARY DATA
14
STD
SRD
16
SECONDARY HANDSHAKE
19
SRTS
SCTS
13
SRLSD
12
CLOCKS
24
SCTE
SCT
15
SCR
17
MISC.
11
SQ
21
U/A
RI
22
INTERVIEW STATUS
RECEIVER IN SYNC
TD
RD
CRT
CONTROL
MANUAL
TRIGGER
FREEZE
CAPTURE MEMORY
CONTROL
MANUAL
TRIGGER
RECORD

Figure 5-1

5
INTERVIEW STATUS INDICATORS

The right-hand section of the INTERVIEW 4600's status panel (see Figure 5-1) has indicators for the status of the trigger logic RECEIVERS, the CRT, and the CAPTURE MEMORY (the 4600's tape and optional high-speed memory).

5.1 RECEIVER IN SYNC

The RECEIVER IN SYNC indicators, labeled TD for Transmitted Data and RD for Received Data, are ON when their respective trigger logic receivers (see Figure 2-1) are "in sync" while monitoring synchronous or bit-oriented protocols. For example, the appropriate indicator is turned on when the synchronization character sequence is encountered in synchronous protocols and remains on until OUTSYNC (see Section 13.2d) is encountered. It is possible for the receivers to be in synchronization but not updating the data on the CRT because the display has been frozen (see Sections 10 and 19.4) or the data is suppressed (see Section 16.2).

When asynchronous protocols are being monitored, the RECEIVER IN SYNC indicators are OFF.

NOTE: These indicators do not indicate status of the separate receivers for the Capture Memory.

5.2 CRT

There are three indicators to show the status of the CRT control logic: TRIGGER, MANUAL, and FREEZE.

(a) Trigger Control. When the trigger LED is ON, the real-time CRT display is being stopped (frozen) or started (unfrozen) by triggers (see Section 19.4). This is the default condition when Run Mode is entered, even if no triggers have been programmed.

(b) Manual Control. When the MANUAL indicator is ON, the CRT display is under manual control and has been stopped or started using the MANUAL FREEZE or the MANUAL UNFREEZE key. These manual keys override trigger control until the RESUME TRIGGER key is operated. Leaving Run Mode cancels manual control.

(c) Freeze. When the FREEZE LED is ON the real-time CRT display has been stopped (frozen) and no new data is being added to the display. This may be the result of either a manual action or a trigger action as indicated by the MANUAL or TRIGGER CRT control indicator.

5.3 CAPTURE MEMORY

If the high-speed random access memory (RAM) is installed in the unit, the CAPTURE MEMORY indicators display status of either TAPE or RAM, whichever is selected on the Record Control menu (Parameters 2; see Section 23.2) or as data source (Parameters 1; see Section 12.3). Otherwise, tape status is shown. There are three Capture Memory LEDs, which operate in much the same manner as the CRT indicators.

The Capture Memory is separate from and should not be confused with the CRT Display Buffer.

(a) Trigger. The TRIGGER control LED is ON when the Capture Memory is being started and stopped by triggers (see Section 23.4). This is the default condition when Run Mode is entered, even if no triggers have been utilized.

(b) Manual. When the MANUAL control indicator is on, the Capture Memory has been started or stopped using the green MANUAL START or MANUAL STOP key and is now under manual control. These manual keys override the trigger controls until the RESUME TRIGGER key is operated. Leaving Run Mode also cancels manual control.

(c) Record. The RECORD indicator is ON when data is being entered in the Record Buffer of the Capture Memory. This may be the result of a manual action or a trigger action, as indicated by the MANUAL or TRIGGER control indicator, or it may be the result of the initial Record Control condition selected on the Parameters 2 menu (see Section 23.2b). If no selections have been made on the Record Control (Parameters 2) menu, the default condition of the Capture Memory when the 4600 enters Run Mode is NOT RECORD, and the RECORD indicator is OFF.

> NOTE: The RECORD LED does not necessarily indicate that the tape is moving. The cartridge recorder uses a buffered recording technique to make maximum use of the tape by recording at the highest allowable density. The tape only moves when data is being transferred from the buffer to the tape. At low data rates, the tape may remain stationary for several minutes at a time while the buffer is being filled. The RECORD LED indicates that data is being entered into the record buffer.

6. THE KEYBOARD

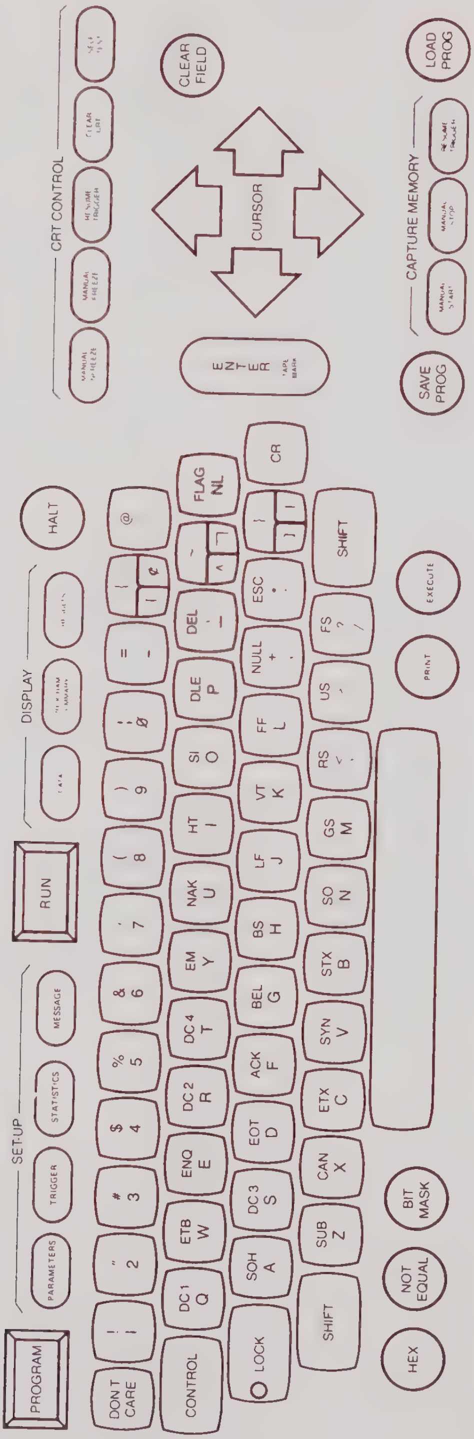

PROGRAM
SET-UP
PARAMETERS
TRIGGER
STATISTICS
MESSAGE
RUN
DISPLAY
DATA
HALT
CRT CONTROL
MANUAL FREEZE
CLEAR FIELD
CURSOR
ENTER
CAPTURE MEMORY
MANUAL START
MANUAL STOP
SAVE PROG
LOAD PROG
DONT CARE
CONTROL
LOCK
SHIFT
DC1 Q
ETB W
ENQ E
DC2 R
DC4 T
EM Y
NAK U
HT I
SI O
DLE P
DEL
FLAG NL
SOH A
DC3 S
EOT D
ACK F
BEL G
BS H
LF J
VT K
FF L
NULL
ESC
CR
SUB Z
CAN X
ETX C
SYN V
STX B
SO N
GS M
RS
US
FS
HEX
NOT EQUAL
BIT MASK
PRINT
EXECUTE

Figure 6-1

6
THE KEYBOARD

6.1 INTRODUCTION

This section is organized by key, rather than by function, because it is intended as a reference source, rather than a procedural instruction. You can use it to gain overall familiarity with the touch-sensitive keyboard, and turn to it whenever you want specific information. A diagram of the INTERVIEW 4600 keyboard is included as Figure 6-1.

Key functions are identified by grouping and color. Many keys are valid in several modes, but the colors indicate their primary functions. Red keys are primarily Program Mode keys; green keys, Run Mode. The two rectangular keys are the mode entry keys: Pressing the red rectangular PROGRAM key enables all the other red keys; pressing the green rectangular RUN key enables all green keys as well as certain red keys.

The yellow keys are special-purpose keys that are valid only for certain specific menus. The blue and gray keys are alphanumeric characters; the blue keys are those also used for hexadecimal entries and the most frequently used protocol characters.

A single audible "beep" confirms a proper key action. A displayed message, KEY ERROR, accompanied by a series of "beeps" calls attention to illegal key use.

Keyboard translation tables for the seven codes standard in the INTERVIEW 4600 as well as Baudot are included as Appendix A.

6.2 RED KEYS: PROGRAM MODE

Key	Program Mode	Run Mode	
		Real Time	Freeze
PROGRAM	Places unit in Program Mode, enables all red program keys, and displays the Program Selection menu.		
PARAMETERS	PARAMETERS followed by number of menu selects all numbered Parameter menus listed on the Program Selection menu.	Invalid	Invalid
TRIGGER	Selects Trigger Summary for Triggers 0 through 7 or 8 through F, depending on which bank was last entered (default display is low bank summary). Summary of alternate bank may then be selected by pressing the UP or DOWN cursor arrow. TRIGGER followed by any number from 0 to F, and then C or A, selects the corresponding specific trigger Conditions or Actions menu.	Invalid	Invalid
STATISTICS	Selects Counter and Timer menu.	Invalid	Invalid
MESSAGE	Displays Message Summary. Followed by any number from 0 to F, selects message menu.	With data or frame or packet protocol displayed, enables keyboard buffer. Transfers keyboard buffer to the keyboard transmit buffer and closes keyboard buffer.	Invalid
CLEAR FIELD	Clears any "typed in" entries in current data-entry field. To clear any displayed menu to its power-up default values, operate CONTROL plus CLEAR FIELD simultaneously.	Clears keyboard buffer. Clears prompt from line 2. CONTROL plus CLEAR FIELD clears keyboard buffer and associated transmit buffer.	Invalid

(continued)

6.2 RED KEYS: PROGRAM MODE (continued)

Key	Program Mode	Run Mode	
		Real Time	Freeze
CLEAR FIELD (cont.)	To clear all triggers, use CONTROL plus CLEAR FIELD with Trigger Summary displayed.		
	To clear from cursor location to the end of current data entry field, operate SHIFT plus CLEAR FIELD simultaneously.	SHIFT plus CLEAR FIELD clears keyboard buffer from cursor location to end.	
CURSOR	When a cursor arrow is held down, after a brief delay the cursor will move continuously until the key is released or until it may no longer logically move in that direction.		
	UP or DOWN arrow moves the cursor up or down to the current selection in first field on the next line, or to first position in field, if choices are to be typed in. (See also ENTER key.)	In tape playback mode, each operation of UP arrow doubles playback speed to max. 9.6 kbps; each operation of DOWN arrow halves speed.	NOTE: When display is frozen, cursor will be at last character of the new data. UP or DOWN arrow moves the cursor up or down to the next line. At top or bottom of CRT window, pulls the next line from the buffer onto the display.
	RIGHT (or LEFT) arrow moves the cursor right (or left) to the next permitted selection or to the next field. (See also ENTER key).	Except for RAM playback, RIGHT and LEFT arrows valid only for keyboard buffer.	RIGHT (or LEFT) arrow moves the cursor right (or left) to the next character or beginning (or end) of next (or preceding) line.
	If cursor is in a window selection field, RIGHT arrow displays next selection in window; LEFT arrow displays preceding selection in window.	During RAM playback, LEFT arrow backs playback up 1 block.	
	Use CONTROL plus CURSOR simultaneously to move cursor directly to last field or selection in cursor arrow direction.	CONTROL plus CURSOR valid only for keyboard buffer.	CONTROL plus CURSOR invalid.
ENTER	Always advances the cursor to the next field, whether to the right or down.	If data source is TAPE, ENTER is invalid, except for keyboard buffer entries.	Invalid

(continued)

6.2 RED KEYS: PROGRAM MODE (continued)

Key	Program Mode	Run Mode	
		Real Time	Freeze
ENTER (cont.)	From bit mask entry field, returns cursor to next character in string or in "1 OF" list or in ENHANCE or SUPPRESS list.	If data source is LINE, ENTER puts a blinking bright reverse-image marker on the CRT at the current location. This marker can be sensed by triggers. If the interface leads are recorded on tape, then the marker (i.e., ENTER key status) is also recorded. When keyboard buffer is open, ENTER transfers keyboard buffer to keyboard transmit buffer without closing keyboard buffer.	Invalid
	While a Trigger Conditions menu is on the screen, CONTROL plus ENTER displays the Actions menu for the same Trigger; if Actions menu is displayed, then Conditions menu appears.		
DON'T CARE	Enters Don't Care character in a string.	Invalid	Invalid
HEX	Latches next two alphanumeric keys (blue keys) to enter one hexadecimal character.	Successive operation places the CRT alternately in and out of hexadecimal display mode. To display only control characters in hexadecimal, operate CONTROL plus HEX.	
NOT EQUAL	In a data entry field, NOT EQUAL followed by a character or BIT MASK selects all characters not equal to the character. Applicable to SUPPRESS and ENHANCE (Parameters 2 menu), STRG and "1 OF" (Trigger Conditions menus), and START/INCL (Parameters 9 menu).	Invalid	Invalid

(continued)

6.2 RED KEYS: PROGRAM MODE (continued)

Key	Program Mode	Run Mode	
		Real Time	Freeze
BIT MASK	Used to select all characters having same bit(s) at selected bit positions(s). Applicable to SUPPRESS and ENHANCE (Parameters 2 menu) and STRG and "1 OF" (Trigger Conditions menus). NOTE: ENTER must be used to return from Bit Mask expansion to the next character in the string or list.	Invalid	Invalid
SAVE PROG	For program-data tapes, moves tape to program storage area and stores the current program on tape. An error message is displayed if no tape is inserted or if the RECORD tab is in the "protect" position. For multiple-program tapes, displays the tape directory menu. If this menu is displayed, saves current program on the tape.	Invalid	Invalid
LOAD PROG	Moves tape to program storage area and loads program from tape. CHECKSUM ERROR is displayed if block cannot be loaded error-free into the 4600. For multiple-program tapes, displays the tape directory menu. If this menu is displayed, loads program currently selected on the menu from the tape.	Invalid	Invalid

6.3 GREEN KEYS: DISPLAY ZONE

Key	Program Mode	Run Mode	
		Real Time	Freeze
RUN	Sets the unit in Run Mode from any Program Mode display and starts test.	Except after the HALT key has been operated, RUN resets all counters and timers, forces the receivers out of synchronization, and restarts the test, but does not move tape to the initial block number or initialize RAM.	
	Enables all green keys.	After HALT, the RUN key restarts the test and forces the receivers out of synchronization without resetting measurements or tape.	
DATA	Invalid	Displays real-time data or frame or packet protocol from the selected source. Restores data display when Program Summary or Results is displayed.	
PROGRAM SUMMARY	Invalid	Displays Trigger Summary. Repeat to see alternate bank. Unit remains in Run Mode. Program, counters, and timers continue.	
RESULTS	Invalid	Displays real-time counters and timers. Unit remains in Run Mode.	
HALT	Invalid	Suspends all RUN MODE operation, including counters and timers. Stops Capture Memory playback or recording (whether tape or RAM).	
		Does not fill in the two blank lines in display where the new data has been overwriting the old.	
		To resume Run Mode operation without resetting measurements, press RUN once.	

6.4 GREEN KEYS: CRT CONTROL ZONE

		Run Mode	
Key	Program Mode	Real Time	Freeze
MANUAL UNFREEZE	Invalid	Starts real-time data display; overrides trigger control of CRT freeze. Turns off the FREEZE status LED; turns on MANUAL LED.	
MANUAL FREEZE	Invalid	Stops real-time data display; overrides trigger control of display. Displays binary pattern of the character (or characters, in dual-line display) at the cursor position in upper right section of CRT. Fills in the two blank lines in the running display where the new data was overwriting the old. Turns on the FREEZE and MANUAL status LEDs. Turns off the TRIGGER status LED. In tape or RAM playback mode, stops playback.	
RESUME TRIGGER	Invalid	Returns the display to trigger control after MANUAL FREEZE or MANUAL UNFREEZE. Turns off MANUAL status LED; turns on TRIGGER status LED. If FREEZE LED comes on, trigger has frozen display.	
CLEAR CRT	Invalid	Clears the CRT screen (and entire 1920-character buffer) of old data momentarily.	
SELF TEST	Invalid	Displays all fonts in code selected on Parameters 1 menu. Operate SELF TEST again to restore previous display mode. Does not affect program operation.	

6.5 GREEN KEYS: CAPTURE MEMORY ZONE

Key	Program Mode	Run Mode	
		Real Time	Freeze
MANUAL START	Invalid	Causes tape or RAM to start recording (or playback): overrides trigger control. Turns on RECORD status LED and MANUAL status LED.	
MANUAL STOP	Invalid	Causes tape or RAM to stop recording (or playback): overrides trigger control. Turns off RECORD status LED; turns on MANUAL status LED.	
RESUME TRIGGER	Invalid	Returns tape or RAM to trigger control after MANUAL START or MANUAL STOP. Turns off MANUAL status LED. If RECORD LED comes ON, a trigger has turned on the tape or RAM.	

6.6 YELLOW KEYS: SPECIAL FUNCTIONS

Key	Program Mode	Run Mode	
		Real Time	Freeze
PRINT	Commands 4600 to output to printer.	Invalid	Commands 4600 to output current display to printer.
EXECUTE	With Parameters 5 menu displayed, starts formatting, duplicating, or retensioning of tape. In units with high-speed memory option: With Parameters 3 menu displayed, transfers data between RAM and Tape. With Parameters 8 menu displayed, executes selected Remote Transfer function.	Invalid	Invalid

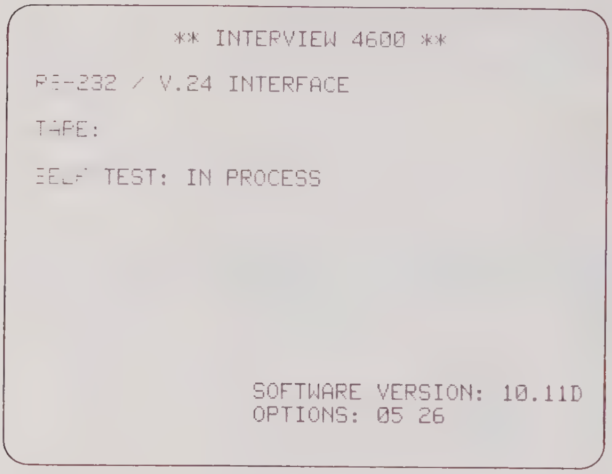
6.7 BLUE AND GRAY KEYS: ALPHANUMERIC AND HEXADECIMAL

Key	Program Mode	Run Mode	
		Real Time	Freeze
Square Gray and Blue keys	Alphanumeric characters, control characters, special symbols.	When Results are displayed, C followed by 1, 2,..., 8 resets the corresponding counter.	
	Keys that are also used for hexadecimal entry (in conjunction with red HEX key) are blue.	When Results are displayed, T followed by 1 or 2 resets the corresponding timer.	
	Commonly used control characters are blue.	When Results are displayed, R resets all counters and timers.	
		All alphanumeric and control character keys can be enabled for making keyboard buffer entries by the MESSAGE key.	When data is displayed, B moves the CRT window to the beginning of the buffer; E moves the CRT window to the End of the buffer.
			F automatically tabs the cursor to the next Frame-control byte and displays the mnemonic expansion (INFO, RNR, NR, etc.) on line 2.
			P automatically tabs the cursor to the next Packet-type byte and displays the mnemonic expansion (LCN, INFO, RNR, PR, Q, D, M, etc.) on line 2.
			CONTROL plus F or CONTROL plus P displays the mnemonic expansion for the character at the current cursor position. NOTE: In this case the logic cannot identify invalid actions.
			On dual-line display, T selects TD, and R selects RD, for all following uses of CONTROL plus F or CONTROL plus P. R cancels preceding T and vice versa.

(continued)

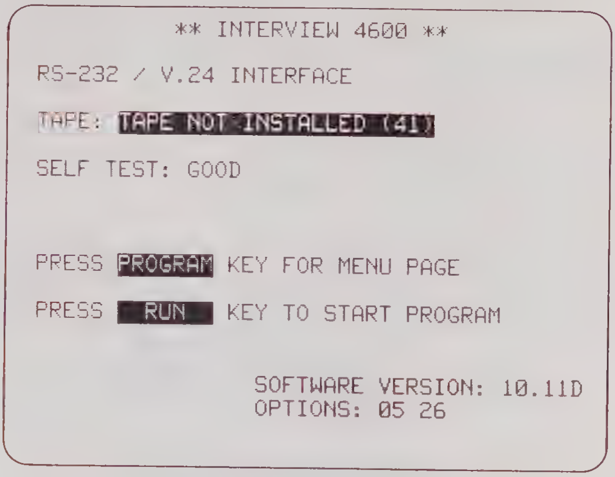
6.7 BLUE AND GRAY KEYS: ALPHANUMERIC AND HEXADECIMAL (continued)

		Run Mode	
Key	Program Mode	Real Time	Freeze
SHIFT (and LOCK)	Hold SHIFT down (or LOCK it down) while accompanying key, or keys, is operated to give upper-case or special character. SHIFT releases LOCK. SHIFT plus CLEAR FIELD clears current data field from cursor to end of field.	May be used for keyboard buffer entry	Invalid
CONTROL	Must be held down while accompanying key is operated.	When data is displayed, CONTROL plus HEX alternately displays all control characters in hexadecimal.	
	Used with an alphanumeric key, gives control character.	May be used for keyboard buffer entry.	
	With red CLEAR FIELD key clears the entire displayed menu to default selections.	While keyboard buffer is open, CONTROL plus CLEAR FIELD clears keyboard transmit buffer as well as keyboard buffer.	
	With CURSOR arrow, moves cursor directly to last position in direction of arrow.		
FLAG (HDLC Formats)	CONTROL plus FLAG enters Flag byte for HDLC framing (zero stuffing). (NOTE: The key sequence HEX, 7, E will not be read as a Flag.)	Invalid	Invalid



```
            ** INTERVIEW 4600 **

RS-232 / V.24 INTERFACE

TAPE:

SELF TEST: IN PROCESS






                SOFTWARE VERSION: 10.11D
                OPTIONS: 05 26
```

Figure 7-1



```
            ** INTERVIEW 4600 **

RS-232 / V.24 INTERFACE

TAPE: TAPE NOT INSTALLED (41)

SELF TEST: GOOD


PRESS PROGRAM KEY FOR MENU PAGE

PRESS   RUN   KEY TO START PROGRAM


                SOFTWARE VERSION: 10.11D
                OPTIONS: 05 26
```

Figure 7-2

7
POWER UP

Please read Section 3 of this manual before you power up the INTERVIEW 4600.

CAUTION: Whenever you power up the 4600, be sure that the ventilator fan at the rear is running.

7.1 POWER-UP WITHOUT TAPE

Without installing a tape in the drive, press the red POWER switch at the right of the front panel. During the internal diagnostic tests automatically conducted at power-up, the CRT display will be similar to that of Figure 7-1. (Your 4600 may have a different software version or option numbers.) If the optional High-Speed Memory (RAM) is installed, these tests may take from several to 30 seconds, depending on which RAM option is present. When the self tests are complete, the display will change to that of Figure 7-2.

The INTERVIEW 4600's default parameters now will be resident in the unit.

The red power switch is an alternate-action key; simply press it a second time to power down the 4600.

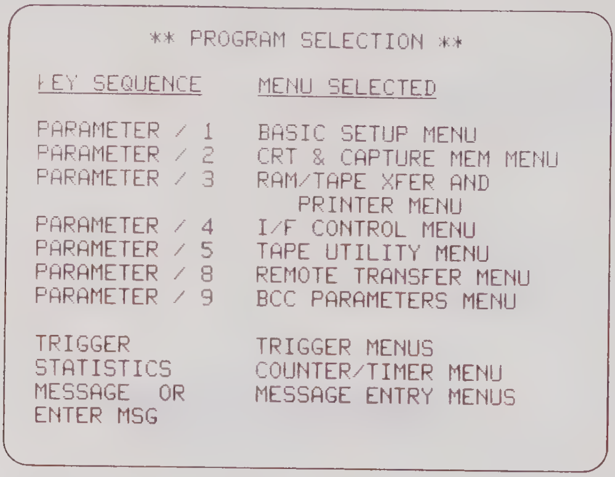
7.2 THE POWER-UP MENU

When the power-up interactive diagnostics among the internal microprocessors are completed, the Power-up menu displays information as follows:

(a) If no tape is installed, the TAPE line displays the message TAPE NOT INSTALLED. If a tape is installed, the message CHECKING TAPE TYPE is displayed while the 4600 ascertains what type of tape it is. (If a program-data tape with a valid 4600 program is found, the unit will automatically load the taped program and go to Run Mode; see Section 25.3.)

NOTE: See Appendix D for explanation of other messages that may be displayed in the TAPE line.

(b) If an error is found during the diagnostic tests, a code indicative of the defective subassembly will be displayed on the SELF TEST line. A list of self-test error codes is given in Appendix K.



```
             ** PROGRAM SELECTION **

 KEY SEQUENCE      MENU SELECTED

 PARAMETER / 1     BASIC SETUP MENU
 PARAMETER / 2     CRT & CAPTURE MEM MENU
 PARAMETER / 3     RAM/TAPE XFER AND
                      PRINTER MENU
 PARAMETER / 4     I/F CONTROL MENU
 PARAMETER / 5     TAPE UTILITY MENU
 PARAMETER / 8     REMOTE TRANSFER MENU
 PARAMETER / 9     BCC PARAMETERS MENU

 TRIGGER           TRIGGER MENUS
 STATISTICS        COUNTER/TIMER MENU
 MESSAGE  OR       MESSAGE ENTRY MENUS
 ENTER MSG
```

Figure 7-3

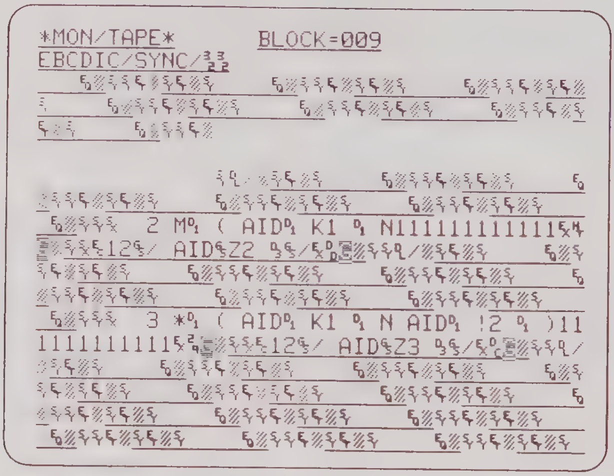
(c) As Figure 7-2 shows, you must choose between two keys at this point: PROGRAM and RUN. Any other key will cause a KEY ERROR response on line 2 of the display and an audible signal. KEY ERROR clears after 3 seconds or when a correct key is operated.

The PROGRAM key will display the Program Selection menu (see Section 7.3). You can then use the program menus to manually develop a program, or you can load a taped program (see Section 25.2). If you press the RUN key, the 4600 will go to Run Mode and expect to monitor data using its default, BISYNC parameters.

(d) You may abort the power-up RAM tests. This is useful if the unit has the 4-Megabit RAM, because the tests may take up to 30 seconds. The tests should not be aborted if you intend to use the RAM during the session. Press the PROG key after the RAM tests are under way (about 8 seconds). The Program Selection menu will be displayed, and you can proceed as explained in Section 7.3.

7.3 PROGRAM SELECTION MENU

When you press the PROGRAM key, the Program Selection menu shown in Figure 7-3 is displayed. This is the basic directory for using the 4600. Each of the menus in this directory is explained in this manual under the appropriate topic (see the Table of Contents and the Subject Index). Whenever you want to be reminded of the menus in your 4600, press the PROGRAM key and the Program Selection menu will be displayed.



```
*MON/TAPE*        BLOCK=009
EBCDIC/SYNC/
```

Figure 8-1

8

USING THE KEYBOARD TO GET RUN MODE DISPLAYS

CAUTION: Always press the PROGRAM key to stop tape motion before you power down the INTERVIEW.

8.1 INTRODUCTION

You can select many aids to data analysis directly in Run Mode, including hexadecimal display, data freeze, and display of the rest of the CRT buffer content. You can stop and start playback and recording, and reset counters and timers. You may view summaries of the trigger program and see data characters broken down into their binary patterns. In addition, some special features are available in the X.25 and SDLC modes; these are discussed in Section 34.

8.2 CRT DISPLAY

The INTERVIEW CRT can display 640 characters (16 lines of 40 characters each; see Figure 8-1) from a 1920-character buffer. It can display transmitted or received data or both, in either single-line or dual-line format.

When an appropriate program has been loaded and a data source connected, press the green rectangular RUN key, once. All counters and timers will reset and the trigger program will restart. Playback from or recording by tape or RAM will begin from the block selected on the Parameters 1 or 2 menu.

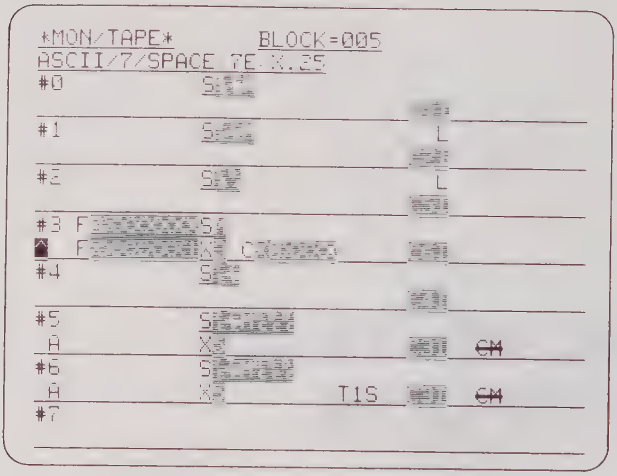
Line 1 of the screen (Figure 8-1) will display the 4600's operating mode, the SOURCE of the data, and the block number at which the Capture Memory is recording or playing back. On the second line will appear basic parameters from the Parameters 1 program menu. If the program includes Prompts, they will be displayed on this line.

For detailed descriptions of the data display, see Sections 9 and 10.

The remainder of this section explains how to use the various green Run Mode keys. Program activity during each of the various displays obtained with the Run Mode keys is summarized in Table 8-1.

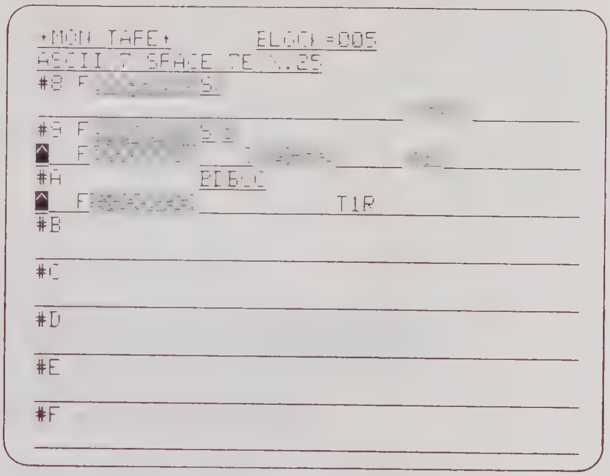
8.3 DISPLAY KEYS

(a) PROGRAM SUMMARY Key. To review the Trigger Summary (explained in Section 20) without leaving Run Mode, press PROGRAM SUMMARY. This will display the summary of the trigger bank that either was last displayed or was active in Run Mode. You may then



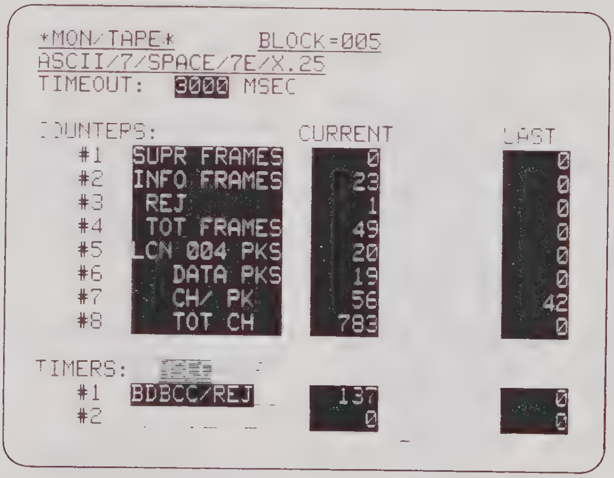
```
*MON/TAPE*          BLOCK=005
ASCII/7/SPACE/7E/X.25
#0               S
#1               S                   L
#2               S                   L
#3 F             S
▲  F             X  C
#4               S
#5               S
 A               X                       CM
#6               S
 A               X          T1S          CM
#7
```

Figure 8-2



```
*MON/TAPE*          BLOCK=005
ASCII/7/SPACE/7E/X.25
#8 F           S
#9 F           S
▲  F
#A             BDBCC
▲  F                     T1R
#B
#C
#D
#E
#F
```

Figure 8-3



```
*MON/TAPE*         BLOCK=005
ASCII/7/SPACE/7E/X.25
TIMEOUT:  3000 MSEC

COUNTERS:              CURRENT          LAST
   #1  SUPR FRAMES           0             0
   #2  INFO FRAMES          23             0
   #3   REJ                  1             0
   #4   TOT FRAMES          49             0
   #5 LCN 004 PKS           20             0
   #6     DATA PKS          19             0
   #7     CH/ PK            56            42
   #8     TOT CH           783             0

TIMERS:
   #1  BDBCC/REJ           137             0
   #2                        0             0
```

Figure 8-4

alternately view the low bank (Triggers 0-7; Figure 8-2) and high bank (Triggers 8-F; Figure 8-3) summaries by repeating the PROGRAM SUMMARY key. While the Program Summary is displayed, no data is received in the CRT buffer, but the counters and timers receive data, the test continues to run, and recording continues.

Use the DATA key to return data to the screen.

(b) RESULTS Key. Use the RESULTS key to view the real-time counter and timer accumulation (see Figure 8-4). Whenever a counter or timer is reset by triggers, the preceding accumulation is displayed in the LAST column next to the CURRENT or real-time value.

The maximum for either counts or time is 65,535. OVerFLOw is displayed to the right of the CURRENT value for any counter or timer that has overflowed this value. OVFLO is also displayed when a counter decrements below zero.

Counters and Timers may be reset manually: While Results are displayed, the C key followed by 1, 2,..., 8 resets the corresponding counter; T followed by 1 or 2 resets the corresponding timer; and R resets all counters and timers. When a counter or timer is reset manually, the LAST value is also reset.

No data is received by the CRT buffer while Results are shown, but the program continues -- as demonstrated by the Results display -- and recording continues.

Use the DATA key to return data to the screen.

(c) RUN Key. To restart the test at any time without leaving Run Mode, press the RUN key. This forces the receivers out of synchronization, resets all counters and timers, and restarts the trigger program. Whether the Capture Memory is recording or playing back data, RUN does not cause the tape to rewind or initialize the RAM.

(d) HALT Key. HALT suspends all monitor activity and freezes the current data on the screen. Counters and timers stop, but do not reset. Capture Memory playback or recording stops, but the tape does not rewind. The timeout timer is stopped.

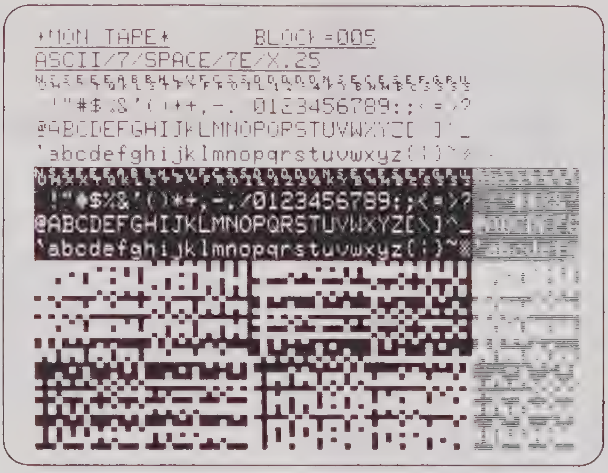
If the 4600 is in an Emulate Mode (Section 28), all of the interface leads are reinitialized and the transmitter is stopped and goes to its normal idle line condition. If the 4600 is in Switched Carrier mode (Section 29), it will not respond to changes on the RS-232/V.24 interface.

To resume program activity after HALT, press RUN once. All monitor and test activities will simply resume from the point at which they stopped: counters and timers will not reset in this case. If the data source is the 4600 tape or RAM, no data will have been lost (because the tape was stopped); if the source is LINE, all input signals received during the time the INTERVIEW was in the Halt Mode will have been ignored.

8.4 CRT CONTROL KEYS

(a) MANUAL FREEZE Keys. The MANUAL UNFREEZE, MANUAL FREEZE, and RESUME TRIGGER keys are given a separate section in this manual, namely, Section 10.

(b) CLEAR CRT Key. Pressing CLEAR CRT clears the screen of data. If real-time data is being displayed, the screen remains clear only momentarily: real-time data flow is automatically resumed.



```
*MON TAPE*          BLOCK=005
ASCII/7/SPACE/7E/X.25
 !"#$%&'()*+,-. 0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ ]^_
`abcdefghijklmnopqrstuvwxyz{|}~
 !"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~
```

Figure 8-5

(c) SELF TEST Key. SELF TEST is an alternate-action key that displays the full character font for the code currently selected on the Parameters 1 menu (see Figure 8-5). The self-test display is also useful for CRT brightness adjustment. Note: In Run Mode, the SELF TEST key is not related to the internal self tests conducted automatically at power-up (discussed in Section 7).

8.5 CAPTURE MEMORY KEYS

The three green Capture Memory keys can be used to control both recording and playback. These keys normally control the tape; if the high-speed memory option is installed in the unit, they can also be used to control RAM.

(a) Data Playback. When tape or RAM has been selected as SOURCE on the Parameters 1 menu, playback may be stopped and started with the MANUAL STOP and MANUAL START keys. The block number in the CRT status line will stop incrementing while playback is stopped, and if the source is tape, tape motion will stop. Data will be frozen on the screen (see also Section 10).

(b) Recording. Recording can be started or stopped at any time with the MANUAL START or MANUAL STOP key. If recording is under trigger control, these keys override the triggers. When recording stops, the block number on the CRT status line will stop incrementing; and if recording is on tape the tape will stop moving.

The only way to return recording to trigger control is to press the RESUME TRIGGER key.

8.6 RUN KEY

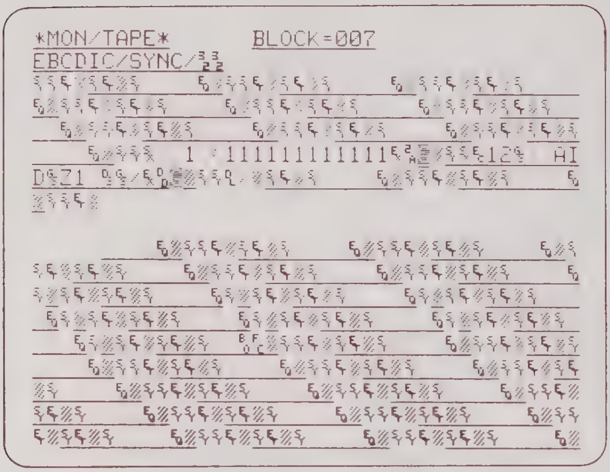
By now you can see that the RUN key may have three different actions, depending on what mode the 4600 is in when the RUN key is operated -- Program Mode, Run Mode, or Halt Mode. The differences are summarized in Table 8-1.

A special Program menu selection allows you to use the RUN key in yet a fourth way. When you select MAINTAIN on the Parameters 4 menu, the RUN key will initialize the INTERVIEW program, but will not change key program parameters -- the trigger flags, and transmit counters. This enables you to run several different INTERVIEW test programs, without going through the often complex process of reestablishing a logical session with the computer or terminal being tested. The use of the MAINTAIN selection is explained in Sections 29 and 35.

TABLE 8-1
COUNTERS, TIMERS, AND CAPTURE MEMORY OPERATION IN RUN MODE

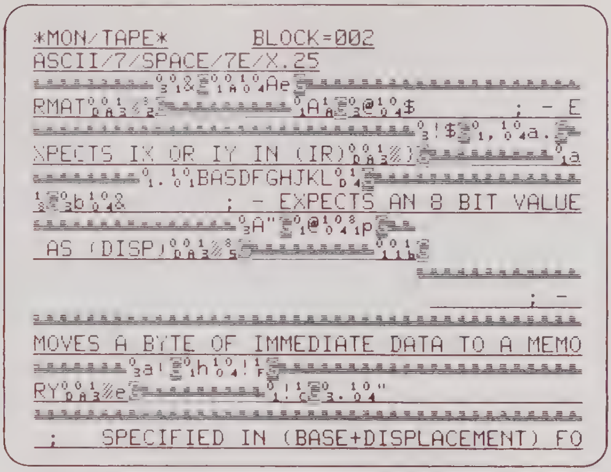
			Capture Memory	
Keys	Counters and Timers	Timeout Timer	Data Playback	Recording
RUN				
in Program Mode	Reset	---	Starts	Starts as commanded
in Run Mode	Reset	Stops	Continues	Continues as commanded
in Halt Mode	Continue as commanded	Stops	Continues	Continues as commanded
DATA	Continue as commanded	Continues as commanded	Continues	Continues as commanded
PROGRAM SUMMARY	Continue as commanded	Continues as commanded	Continues	Continues as commanded
RESULTS	Continue as commanded	Continues as commanded	Continues	Continues as commanded
HALT	Stop; do not reset	Stops	Stops	Stops
FREEZE				
Line data	Continue as commanded	Continues as commanded	---	Continues as commanded
Recorded data	Stop; do not reset	Continues as commanded	Stops	---
CLEAR CRT	Continue as commanded	Continues as commanded	Continues	Continues as commanded
SELF TEST	Continue as commanded	Continues as commanded	Continues	Continues as commanded

9. RUN MODE: DATA DISPLAY



```
*MON/TAPE*       BLOCK=007
EBCDIC/SYNC/
```

Figure 9-1



```
*MON/TAPE*       BLOCK=002
ASCII/7/SPACE/7E/X.25
Ae
RMAT  A @ $                 ; - E
 $  1,  a.
XPECTS IX OR IY IN (IR)
 1. BASDFGHJKL
 b &          ; - EXPECTS AN 8 BIT VALUE
 A" @ p
 AS (DISP)

                                       ; -

MOVES A BYTE OF IMMEDIATE DATA TO A MEMO
 a ! h ! 
RY e ! 3.

 ;   SPECIFIED IN (BASE+DISPLACEMENT) FO
```

Figure 9-2

9

RUN MODE: DATA DISPLAY

Four display modes can be selected on the Parameters 2 menu: (1) Single and (2) Dual Line, and (3) Frame and (4) Packet. FRAME is a protocol display which can be chosen for X.25, SDLC, and DDCMP formats; PACKET protocol display is valid for X.25 format. The protocol displays are explained in Section 34.3. SINGLE and DUAL line are data displays. They are discussed in this section.

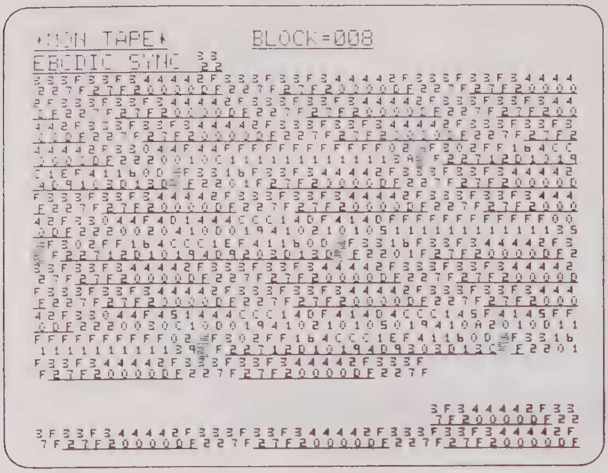
9.1 DATA DISPLAY MODE

Single-or dual-line display is selected in Program Mode on the Parameters 2 menu (see Section 16).

(a) Single Line. In single-line display (Figure 9-1), DCE (RD) and DTE (TD) data are displayed alternately on the same line. They are easily distinguished because DCE data is always underlined (to identify it as originating from the communication line).

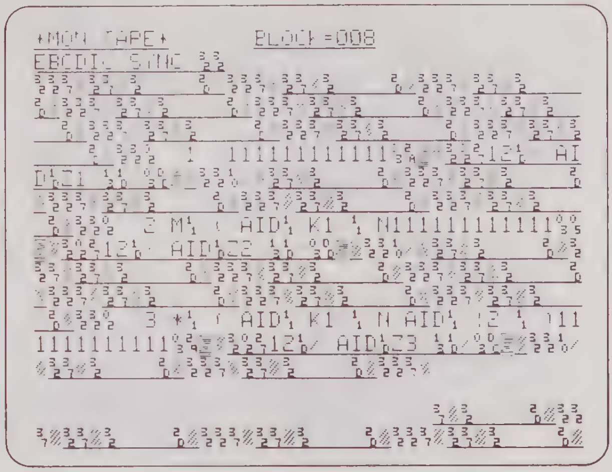
(b) Dual Line. In dual-line display (Figure 9-2), DTE (TD) data begins on the first data line. DCE (RD) data (always underlined) is shown on alternating lines beginning with the second data line. Time correlation between TD and RD is maintained by a low-intensity L-shaped fill symbol.

In dual-line display the relationship between the Transmit and Receive data is accurate to within plus or minus 1 character.



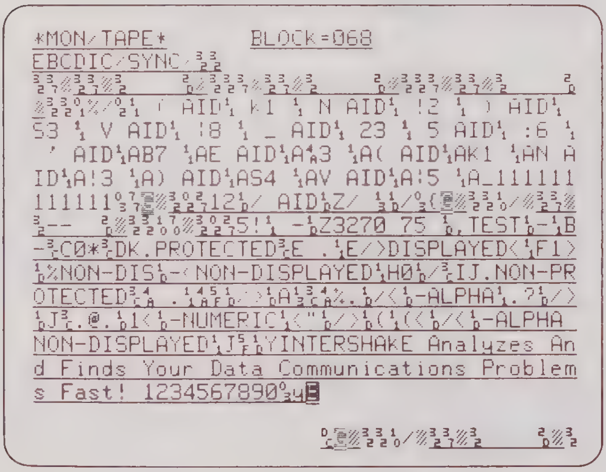
```
*MON/TAPE*        BLOCK=008
EBCDIC/SYNC
```

Figure 9-3



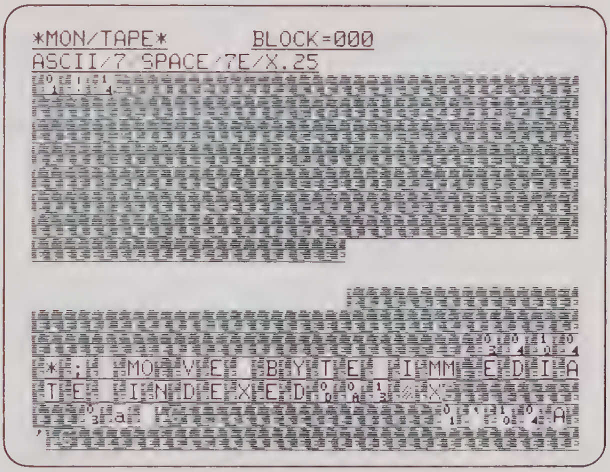
```
*MON/TAPE*        BLOCK=008
EBCDIC/SYNC
```

Figure 9-4



```
*MON/TAPE*        BLOCK=068
EBCDIC/SYNC
d Finds Your Data Communications Problem
s Fast! 1234567890
```

Figure 9-5



```
*MON/TAPE*        BLOCK=000
ASCII/7 SPACE/7E/X.25
```

Figure 9-6

9.2 HEXADECIMAL DISPLAY

To display all data in hexadecimal, press the red HEX key once (see Figure 9-3); to return to the original text display, press HEX again.

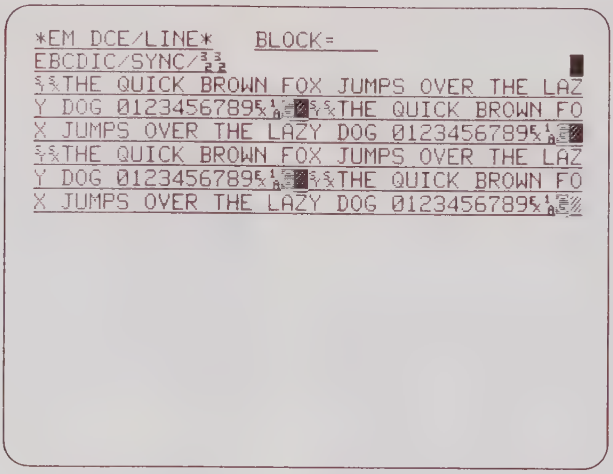
To display only control characters in hexadecimal (see Figure 9-4), hold the CONTROL key down while you operate the HEX key. To restore the original text, press CONTROL-HEX again. For 7E/X.25 and SDLC formats, the default condition is to display protocol characters in hexadecimal, but CONTROL-HEX still works in the same alternate-action fashion. HEX and CONTROL-HEX are also effective on the Self Test display.

9.3 BLOCK CHECK CHARACTERS

When Received Block Check is ON in the unit (see Section 14), a Good block check is represented on the display by a low-intensity reverse-image letter G replacing the last block check character. A Bad block check or an Aborted block is shown by replacing the last block check character with a bright reverse-image B or A, respectively. (Figure 9-5 shows a good and a bad block check.)

9.4 FLAGS

The Flag byte, 7E (hex), used for framing 7E/X.25 and SDLC protocols is displayed as low-intensity reverse-image 7E to distinguish it from transparent data 7E (see Figure 9-6).



```
*EM DCE/LINE*    BLOCK=
EBCDIC/SYNC/3232                                        █
SYSYTHE QUICK BROWN FOX JUMPS OVER THE LAZ
Y DOG 0123456789EX1B▤▨SYSYTHE QUICK BROWN FO
X JUMPS OVER THE LAZY DOG 0123456789EX1B▤▨
SYSYTHE QUICK BROWN FOX JUMPS OVER THE LAZ
Y DOG 0123456789EX1B▤▨SYSYTHE QUICK BROWN FO
X JUMPS OVER THE LAZY DOG 0123456789EX1B▤▨
```

Figure 9-7

9.5 MARKER

In Run Mode, when the data source is not tape, the ENTER key can be used to mark incoming data when it first appears on the screen: The last character received before ENTER is depressed will appear in blinking bright reverse image. If you freeze the display with the MANUAL FREEZE key while the marked characters are still on the screen, the markers will remain and you will then be able to study the data of interest. The marker may be recorded on tape (see Section 23.2e), or sensed by triggers (Section 18.7). Figure 9-7 shows the marker used as the condition for the 4600 to start transmission.

9.6 OTHER HIGHLIGHTS

Other data highlights include reverse, low-intensity, and blink. They are chosen in Program Mode (see Sections 16.3 and 19.4).

9.7 PLAYBACK FROM CAPTURE MEMORY

When the data source is the Capture Memory, TAPE or RAM is displayed on the first line followed by the block number, which can be seen to increment during playback.

During playback, the data display may be speeded up or slowed. Each operation of the UP cursor arrow doubles the playback speed to a maximum of 9.6 kbps. Each operation of the DOWN cursor arrow halves the playback speed.

> NOTE: Remember that manually altering playback speed may invalidate the timer readings.

If the data source is RAM, you may "back up" by one block by pressing the left cursor arrow (see Section 23.6e).

10
RUN MODE: MANUAL FREEZE

FREEZE, whether under manual or trigger control, means that no new data is being added to the CRT display or buffer. Data already received is "frozen" on the screen and in the buffer. The CRT Freeze indicator on the status panel is ON.

10.1 MANUAL UNFREEZE KEY

When the display has been frozen by triggers, the MANUAL UNFREEZE key will restore data flow to the CRT. The triggers cannot refreeze the display while it is under manual control.

10.2 MANUAL FREEZE KEY

When the display is frozen with the MANUAL FREEZE key, Triggers cannot unfreeze it. A number of useful special features are available while the CRT is manually frozen (see Sections 10.6 through 10.9).

10.3 RESUME TRIGGER KEY

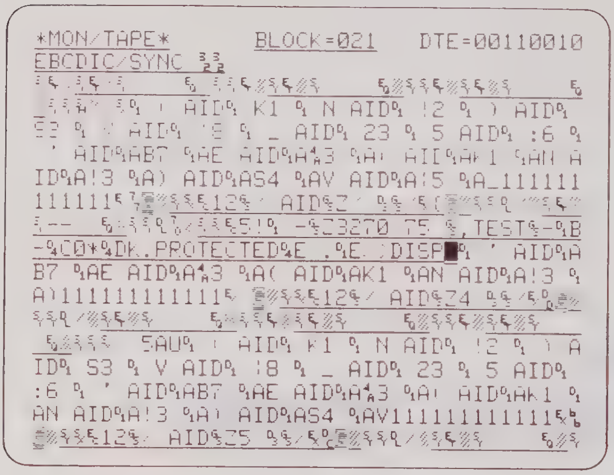
Trigger control of CRT Freeze is the default condition. The MANUAL FREEZE and MANUAL UNFREEZE keys both override trigger control of the CRT. You may manually freeze and unfreeze the display as often as you wish. Trigger control can be restored only by pressing RESUME TRIGGER.

10.4 STATUS INDICATORS

The CRT status LEDs on the front panel always indicate whether the display is frozen and whether it is under manual or program (trigger) control (see Section 5.2).

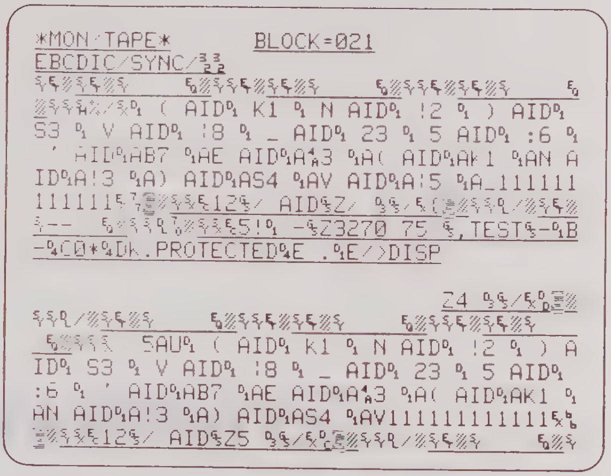
10.5 PROGRAM ACTIVITY

When the display is frozen, whether manually or under trigger control, data reception (for analysis), counting, and timing continue as programmed or manually commanded, and real-time Results can be viewed just as during real-time data display.



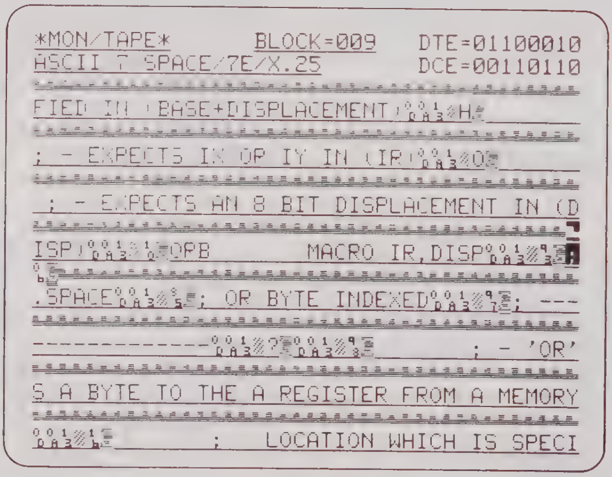
```
*MON/TAPE*          BLOCK=021     DTE=00110010
EBCDIC/SYNC

       AID K1   N AID  !2   ) AID
S3     AID  !8    _ AID 23   5 AID :6
 ' AIDAB7 AE AIDA3 A( AIDAK1 AN A
IDA!3 A) AIDAS4 AV AIDA!5 A_111111
111111     12/ AIDZ/
 --        5!  -Z3270 75  ,TEST-B
-C0*Dk.PROTECTEDE .E >DISP   ' AIDA
B7 AE AIDA3 A( AIDAK1 AN AIDA!3
A)1111111111111    12/ AIDZ4

        SAU  ( AID K1   N AID  !2   ) A
ID S3   V AID  !8   _ AID 23   5 AID
:6   ' AIDAB7 AE AIDA3 A( AIDAK1
AN AIDA!3 A) AIDAS4 AV1111111111111
   12/ AIDZ5
```

Figure 10-1



```
*MON/TAPE*          BLOCK=021
EBCDIC/SYNC/

       ( AID K1   N AID  !2   ) AID
S3   V AID  !8    _ AID 23   5 AID :6
 ' AIDAB7 AE AIDA3 A( AIDAK1 AN A
IDA!3 A) AIDAS4 AV AIDA!5 A_111111
111111     12/ AIDZ/
 --        5!  -Z3270 75  ,TEST-B
-C0*Dk.PROTECTEDE .E/>DISP

                                  Z4
        SAU  ( AID K1   N AID  !2   ) A
ID S3   V AID  !8   _ AID 23   5 AID
:6   ' AIDAB7 AE AIDA3 A( AIDAK1
AN AIDA!3 A) AIDAS4 AV1111111111111
   12/ AIDZ5
```

Figure 10-2



```
*MON/TAPE*        BLOCK=009     DTE=01100010
ASCII T SPACE/7E/X.25           DCE=00110110

FIED IN (BASE+DISPLACEMENT)  H

; - EXPECTS IX OR IY IN (IR  0

 ; - EXPECTS AN 8 BIT DISPLACEMENT IN (D

ISP)   ORB          MACRO IR,DISP

.SPACE  ; OR BYTE INDEXED  ; ---

-------------              ; - 'OR'

S A BYTE TO THE A REGISTER FROM A MEMORY

              ;    LOCATION WHICH IS SPECI
```

Figure 10-3

10.6 IDENTIFYING THE MANUAL FREEZE DISPLAY

In MANUAL FREEZE, the two blank lines on the screen where the new data was overwriting the old are filled in and a character bit pattern is displayed at the upper right. Notice the difference between the Manual Freeze display (Figure 10-1) and that seen in Trigger Freeze or Halt Mode (Figure 10-2).

10.7 CAPTURE MEMORY BLOCK DISPLAY

If the data source is TAPE or RAM, the block number is displayed on Line 1 of the screen but does not increment, indicating that playback has stopped. If the unit was recording, recording continues and the tape or RAM block number on Line 1 continues to increment.

10.8 CURSOR CONTROL

The two blank lines where the new data was overwriting the old when the display was running real time fill in (with old data) when the display is manually frozen. However, when the display freezes the cursor is at the latest character of the new data, so it is easy to tell where the new data begins.

From this initial position the cursor will not move into the old data. The cursor forms a boundary between the old and the most recent data: when it is moved to the left, the old data disappears from the display, but remains in the CRT buffer.

While the CRT is frozen, you can see all of the 1920-byte CRT buffer contents. To display the beginning of the buffer, press the B key. The E key will display the end of the buffer. Intermediate positioning of the CRT window can be accomplished with the up or down cursor arrow. When the cursor reaches the top or bottom of the window, it pulls the next line of data onto the screen.

The right (or left) cursor arrow moves the cursor right (or left) until it "wraps around" to the beginning (or end) of the next (or preceding) line.

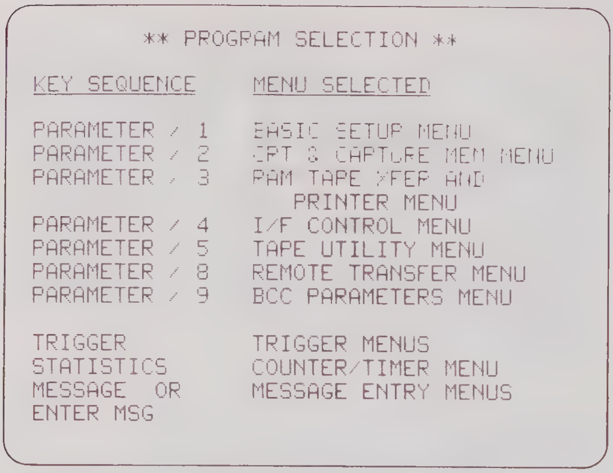
10.9 BINARY CHARACTER BREAKDOWN

At the right end of the top line (or top two lines in the case of dual-line display), the character (or characters) at the cursor location is broken down into its binary pattern and its source identified as DCE or DTE (Figures 10-3 and 10-1). You can obtain this binary breakdown of any character on the screen by positioning the cursor on the character.

NOTE: The rightmost bit is the first serial bit received.

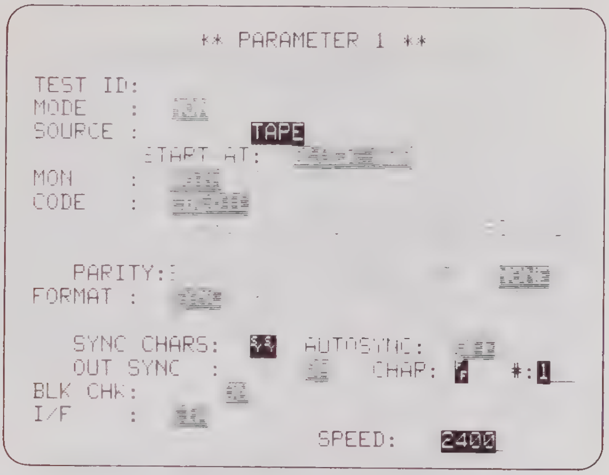
10.10 OTHER RUN MODE KEYS

HEX or CONTROL-HEX can be used just as in real-time monitoring. CLEAR CRT, SELF TEST, PROGRAM SUMMARY, DATA, HALT, and the CAPTURE MEMORY keys also work in Freeze. For bit-oriented protocols (7E/X.25, BSC/X.25, SDLC, and SDLC/NRZI), some special key functions are available in Freeze Mode. These are discussed in Section 34.



```
              ** PROGRAM SELECTION **

 KEY SEQUENCE      MENU SELECTED

 PARAMETER / 1     BASIC SETUP MENU
 PARAMETER / 2     CPT & CAPTURE MEM MENU
 PARAMETER / 3     RAM TAPE XFER AND
                      PRINTER MENU
 PARAMETER / 4     I/F CONTROL MENU
 PARAMETER / 5     TAPE UTILITY MENU
 PARAMETER / 8     REMOTE TRANSFER MENU
 PARAMETER / 9     BCC PARAMETERS MENU

 TRIGGER           TRIGGER MENUS
 STATISTICS        COUNTER/TIMER MENU
 MESSAGE  OR       MESSAGE ENTRY MENUS
 ENTER MSG
```

Figure 11-1



```
              ** PARAMETER 1 **

 TEST ID:
 MODE   :  [illegible]
 SOURCE :          TAPE
        START AT:  [illegible]
 MON    :  [illegible]
 CODE   :  [illegible]


   PARITY:                                [illegible]
 FORMAT :  [illegible]

   SYNC CHARS: SYSY  AUTOSYNC: [illegible]
   OUT SYNC  :       [illegible]   CHAR: F   #:1
 BLK CHK:      [illegible]
 I/F    :  [illegible]
                       SPEED:   2400
```

Figure 11-2

11

MAKING PROGRAM SELECTIONS

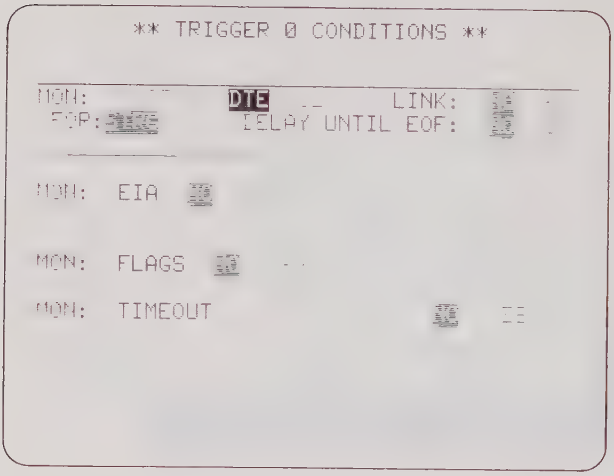
The program menus in your INTERVIEW 4600 are all listed on the Program Selection menu (Figure 11-1). This menu will be displayed whenever you press the PROGRAM key.

To display any of the PARAMETER menus, press the PARAMETERS key followed by the number given on the Program Selection menu. Use the TRIGGER, STATISTICS, or MESSAGE key to gain access to the other menus, as indicated on the display.

The INTERVIEW 4600's program menus show you only pertinent selections. As you make your selections, some new possibilities may appear while unnecessary choices will be eliminated. You will neither have to make unnecessary decisions nor be allowed to neglect anything essential.

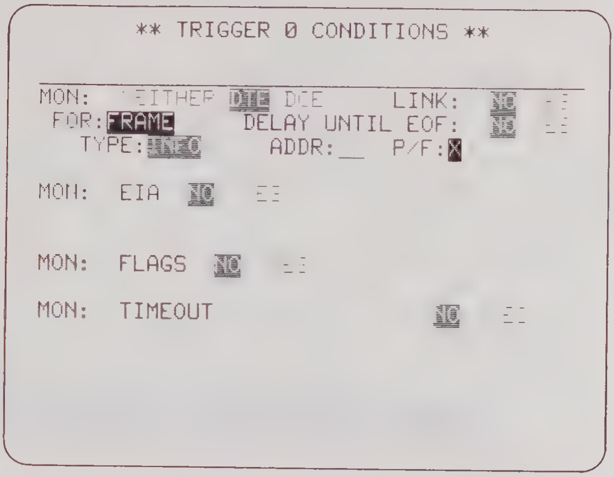
The various program menus offer two categories of programming fields: selection fields and data-entry fields. In a selection field, you are offered a choice of entries and the current selection is displayed in low-intensity reverse image. Data-entry fields are displayed in bright reverse image to indicate that you may type in data directly from the keyboard. In Figure 11-2, for instance, the SOURCE line is a selection field, and the BLOCK field is a data-entry field. The START AT line is actually a selection field containing a data-entry field, since you must choose between BLOCK number and CONT before you enter the block number.

Selections are made by positioning the blinking, bright, reverse-image cursor. To move the cursor from one field to the next without changing prior selections, press the red ENTER key.



```
              ** TRIGGER 0 CONDITIONS **

MON:             DTE            LINK:  [illegible]
 FOR:[illegible]      DELAY UNTIL EOF:  [illegible]

MON:  EIA [illegible]

MON:  FLAGS [illegible]

MON:  TIMEOUT                   [illegible]
```

Figure 11-3

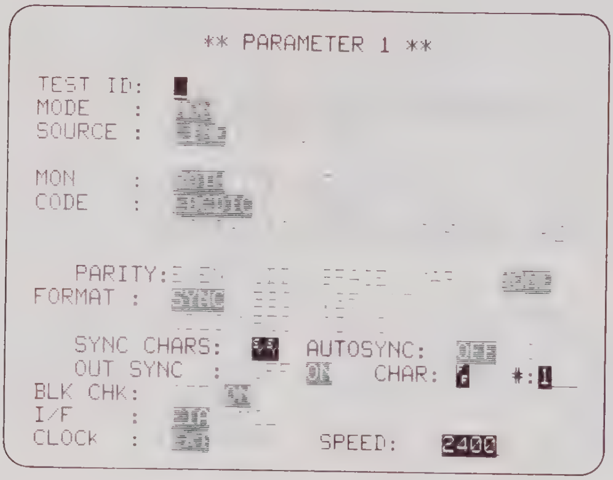


```
              ** TRIGGER 0 CONDITIONS **

MON:    EITHER DTE DCE      LINK:  NO
 FOR:FRAME       DELAY UNTIL EOF:  NO
   TYPE:INFO       ADDR:__   P/F:X
MON:  EIA  NO

MON:  FLAGS  NO

MON:  TIMEOUT                     NO
```

Figure 11-4

The cursor will move directly to the default or current selection in the next field or to the first position in the case of a data-entry field. To move the cursor within a field, use the CURSOR arrows. Once you have made your selection, use ENTER to leave the field. The UP arrow will take you back to the preceding field if you have overshot your mark. See Section 6.2 for a complete description of cursor operation.

Some selection fields are rotating window fields, namely, the FOR and TYPE fields on the trigger conditions menus (see Figures 11-3 and 11-4) and the TYPE, NR, NS, PR, and PS fields on the message-entry menus. To make selections in these fields, press the RIGHT cursor arrow to sequence through the field in one direction, or the LEFT arrow to display selections in the reverse order. The ENTER key should always be used to leave these fields once you have made your choice. To correct a data entry, you may position the cursor on the error and write over it. (Backspacing with the LEFT cursor arrow changes selections but does not alter data entries.) Pressing CLEAR FIELD clears the current data-entry field. SHIFT plus CLEAR FIELD clears a data-entry field starting at the cursor position, and CONTROL-CLEAR FIELD clears an entire menu to default condition.



```
                 ** PARAMETER 1 **

TEST ID:
MODE    : [illegible]
SOURCE  : [illegible]

MON     : [illegible]
CODE    : [illegible]

   PARITY:[illegible]
FORMAT :  SYNC

   SYNC CHARS: [illegible]   AUTOSYNC: OFF
   OUT SYNC  :      ON     CHAR: [illegible]   #:1
BLK CHK:      [illegible]
I/F     : [illegible]
CLOCK   : [illegible]          SPEED:   2400
```

Figure 12-1

12

SELECTING THE 4600'S OPERATING MODE

To select all the basic parameters necessary to monitor any variety of data or use any of the 4600's three interactive test modes, press the red PROGRAM key to enter Program Mode; then press the PARAMETERS key followed by numeral 1. The display of Figure 12-1 will appear, but it will vary somewhat, depending on what program is already present. Figure 12-1 is the default menu.

12.1 TEST ID

A test identifier of up to 27 characters may be typed onto this line. All alpha, numeric, and control characters are valid in this data-entry field. When a saved program has been loaded from the tape, the ID of that program appears on Line 3. If data is to be recorded, it is useful to use this line to identify the system or channel, date, time, and so on, so that this information is saved on the tape along with the program and data.

12.2 MODE

On this link, choose among MONITOR, two interactive EMULATE modes, and H-SPD MON. The following description of each mode assumes that the correct data connection has been made on the rear of the unit.

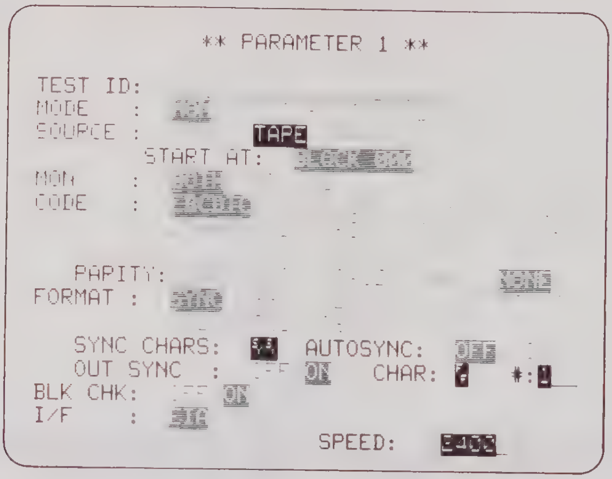
(a) Monitor. This is the passive mode. In Monitor Mode, the INTERVIEW will receive data and perform extensive diagnostics on it. The circuit under test will not be interrupted. You may monitor and analyze data from the line or from the 4600's integral tape -- or from RAM if your unit has the high-speed memory option. In this mode, use the MONITOR data connector.

CAUTION: When either of the following two interactive modes is selected, a data line must be broken to enable testing.

(b) Emulate DTE. Make this selection for interactive testing of the DCE. Break the data line from DTE and connect the DCE to the TO MODEM, EMULATE DTE connector on the 4600.

(c) Emulate DCE. This mode is for testing the DTE. Break the data line from DCE and connect DTE to the TO TERMINAL, EMULATE DCE connector.

(d) High-Speed Monitor. This mode is intended for use at line data speeds above 19.2 kbps and up to 72 kbps. Please see Section 32 for information on high-speed operation.



```
               ** PARAMETER 1 **

TEST ID:
MODE    :  [illegible]
SOURCE  :            TAPE
          START AT:   BLOCK 000
MON     :  OFF
CODE    :  EBCDIC


   PARITY:                                  NONE
FORMAT  :  SYNC

   SYNC CHARS:  32  AUTOSYNC:  OFF
   OUT SYNC   :  OFF ON    CHAR: [illegible]    #:1
BLK CHK:  OFF ON
I/F     :  EIA
                         SPEED:   2400
```

Figure 12-2

12.3 SOURCE

This selection field determines the source of the data to be monitored or tested.

(a) LINE is the default selection. In Monitor Mode when LINE is selected, the INTERVIEW will monitor data received at one of the line interface connectors on the rear panel.

In Emulate DTE Mode when LINE is selected, the 4600 will transmit on TD and receive on RD. In Emulate DCE Mode, the 4600 will transmit on RD and receive on TD.

(b) TAPE allows data that has been recorded on tape to be played back and displayed. Selecting TAPE brings up the START AT field on Line 6. The CLOCK selection field (last line of the menu) goes away because the tape always plays back on internal clock.

(c) RAM appears as a choice on the SOURCE line only if the high-speed random access memory option has been installed in the unit. When you select RAM, the data content of the RAM will be played back. The START AT field is displayed on Line 6 -- see (b) above -- and the CLOCK field goes away.

(d) Playback in Emulate Modes. If EM DTE is selected and the SOURCE is TAPE or RAM, then the Capture Memory will play back on the RD lead and the 4600's transmitter, which is controlled by triggers, will be assigned to TD. If EM DCE is selected and the SOURCE is TAPE or RAM, then the Capture Memory will play back on the TD lead and the 4600's transmitter will be assigned to RD.

12.4 START AT

This selection field only appears if the SOURCE selected is either TAPE or RAM (see Figure 12-2). It determines the block of tape or RAM at which the 4600 will begin to play back data.

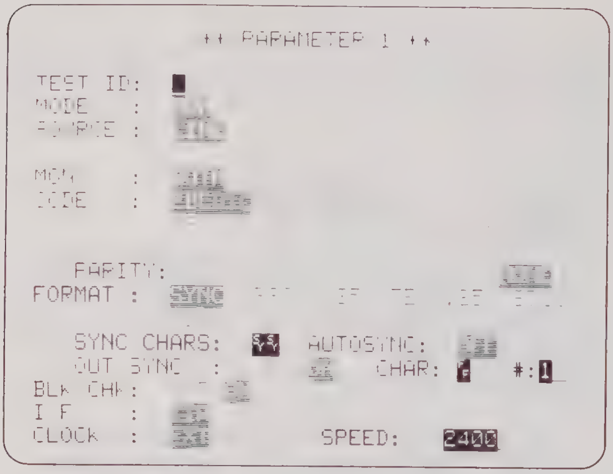
> NOTE: Tapes should be preformatted; see Sections 22 and 23 for a thorough discussion of tape operation and block numbering.

If BLOCK 000 is selected, the tape will rewind when RUN is pressed and start to play from the first block recorded on the tape. This is the default selection. The number of any other block may be entered as the starting point. There are about 250 blocks on a tape; and 54 blocks in 1-Megabit RAM.

CONTinue allows playback to resume from the block that was being played before leaving Run Mode. For example, if during playback at Block 015 you want to change a program menu, press the PROGRAM key, make the desired changes, and select CONTINUE. When you return to Run Mode, playback will automatically continue from Block 015.

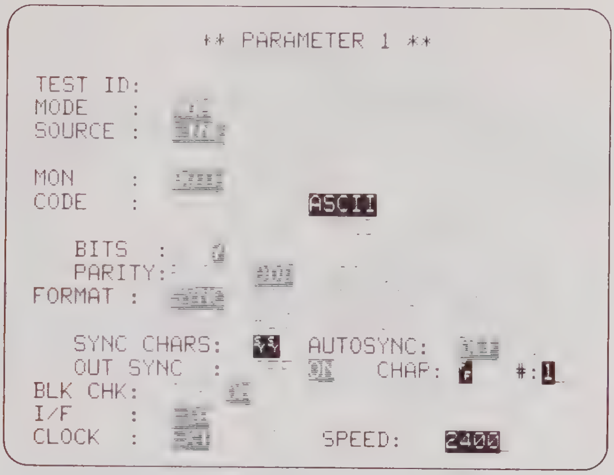
12.5 MONITOR

You may choose to see the data originating at the Data Terminal Equipment (DTE), the Data Communication Equipment (DCE), or BOTH. The default selection is to display BOTH.



```
               ** PARAMETER 1 **

TEST ID: █
MODE    : [illegible]
SOURCE  : [illegible]

MON     : [illegible]
CODE    : [illegible]


   PARITY:                              [illegible]
FORMAT :  SYNC

   SYNC CHARS:  SY SY  AUTOSYNC:  [illegible]
   OUT SYNC   :      [illegible]   CHAR: F     #: 1
BLK CHK:       [illegible]
I/F     : [illegible]
CLOCK   : [illegible]          SPEED:    2400
```

Figure 13-1



```
               ** PARAMETER 1 **

TEST ID:
MODE    : [illegible]
SOURCE  : [illegible]

MON     : [illegible]
CODE    :                    ASCII

   BITS    :    [illegible]
   PARITY:       [illegible]
FORMAT :  [illegible]

   SYNC CHARS:  SY SY  AUTOSYNC:  [illegible]
   OUT SYNC   :      ON        CHAR: F     #: 1
BLK CHK:       [illegible]
I/F     : [illegible]
CLOCK   : [illegible]          SPEED:    2400
```

Figure 13-2

13
FORMAT AND CODE SELECTION

Both the data code and the data format are selected on the Parameters 1 menu. Your Code and Format selections each determine which of several other selections will be displayed.

13.1 CODE SELECTIONS

(a) Code (Lines 8 and 9). The standard 4600 gives you a choice of seven codes, namely, EBCDIC, ASCII, EBCD, XS-3, IPARS, REVerse EBCD, and SELECTRIC, as well as HEX (see Figure 13-1). The default code is EBCDIC. In the remaining fields, you will only be shown choices allowed for your CODE selection. Your code choice also determines the default selections for some of the remaining parameters. Table 13-1 gives details of the synchronization character translations that result from each code choice. The code selection also helps determine the default CRC calculation (see Section 14).

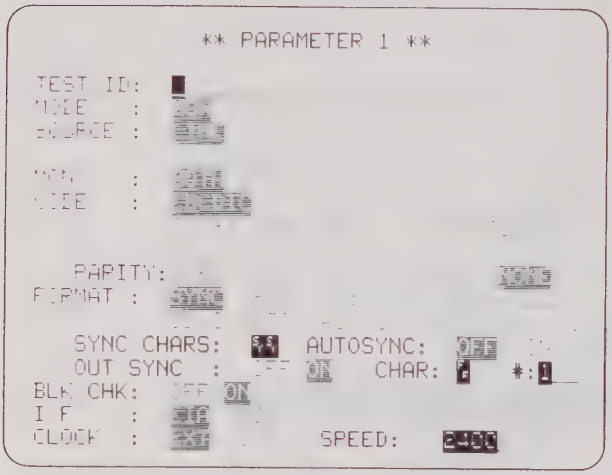
The HEX selection permits the 4600 to monitor codes not included in the menu choices. When HEX is selected the number of information bits, parity, and SYNC characters may be operator-selected. All data will be displayed in hexadecimal. Any data entry not made in hexadecimal, that is, entered without the HEX key, will be entered as the ASCII equivalent of the keyboard character.

(b) Bits (Line 10). The BITS field appears for codes having more than one possible number of information bits (Figure 13-2). Only the number of information bits is selected here: the parity bit is not included. For the default CODE (EBCDIC), no selection is available and this field is not visible. For ASCII, the choices are 8 and 7 bits. The choices allowed and the default values for each code are included in Table 13-1.

(c) Parity (Line 11). When you select a code that uses PARITY, this selection field (Figure 13-2) allows you to choose parity. The parity bit is additional to the data information bits. The parity bit can be tested and counted (Section 18.3) and parity errors can be enhanced (Section 16.3).

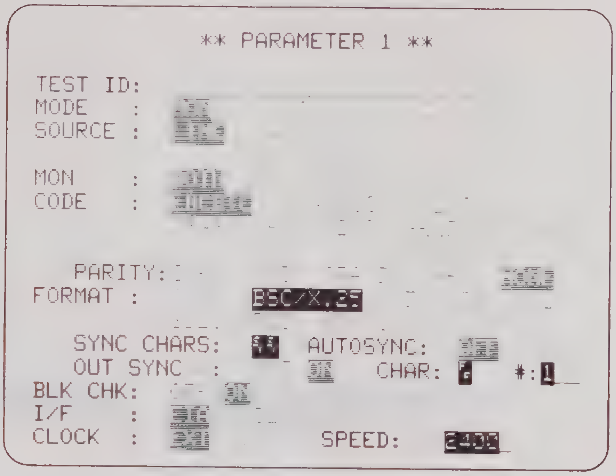
Notice that MARK or SPACE may be selected as the parity bit condition. Violations will then be considered as parity errors.

The INTERVIEW can monitor and transmit 8-bit codes plus parity. You may select either odd or even parity -- mark and space are invalid in this case.



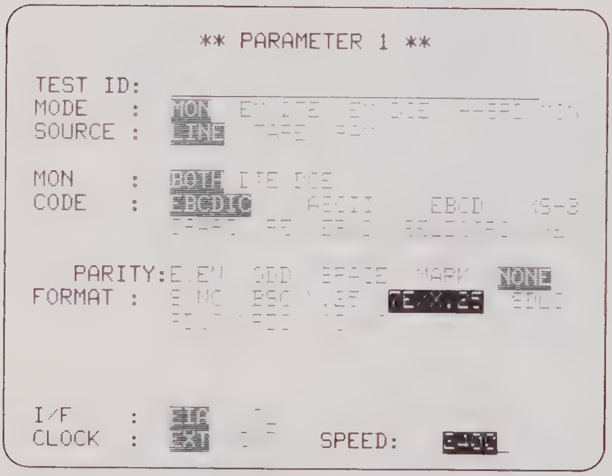
```
           ** PARAMETER 1 **

TEST ID:
MODE   :  MON
SOURCE :  LINE

MON    :  BOTH
CODE   :  EBCDIC


   PARITY:                            NONE
FORMAT :  SYNC

   SYNC CHARS: [illegible]  AUTOSYNC:  OFF
   OUT SYNC  :  OFF ON     CHAR: F     #:1
BLK CHK:  OFF ON
I/F    :  EIA
CLOCK  :  EXT         SPEED:    2400
```

Figure 13-3



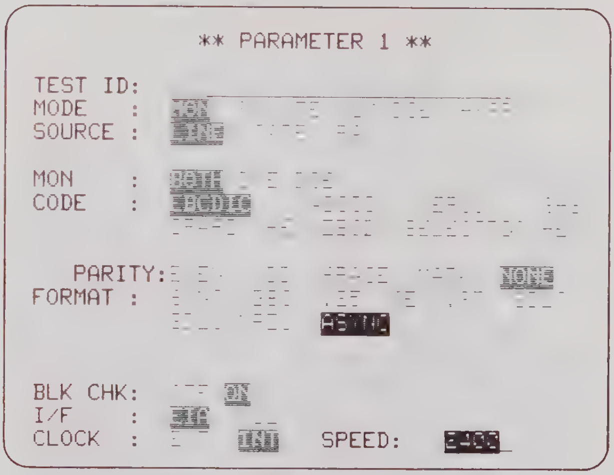
```
           ** PARAMETER 1 **

TEST ID:
MODE   :  MON
SOURCE :  LINE

MON    :  BOTH
CODE   :  EBCDIC


   PARITY:                            NONE
FORMAT :           BSC/X.25

   SYNC CHARS: [illegible]  AUTOSYNC:  OFF
   OUT SYNC  :        ON   CHAR: F     #:1
BLK CHK:      ON
I/F    :  EIA
CLOCK  :  EXT         SPEED:    2400
```

Figure 13-4



```
           ** PARAMETER 1 **

TEST ID:
MODE   :  MON
SOURCE :  LINE  TAPE

MON    :  BOTH DTE DCE
CODE   :  EBCDIC      ASCII      EBCD

   PARITY:EVEN  ODD  SPACE  MARK  NONE
FORMAT :                TE/X.25   SDLC



I/F    :  EIA
CLOCK  :  EXT         SPEED:    2400
```

Figure 13-5



```
           ** PARAMETER 1 **

TEST ID:
MODE   :  MON
SOURCE :  LINE

MON    :  BOTH
CODE   :  EBCDIC

   PARITY:                            NONE
FORMAT :
                    ASYNC


BLK CHK:      ON
I/F    :  EIA
CLOCK  :        INT   SPEED:    2400
```

Figure 13-6

Eight bits plus parity is permitted only in Synchronous or Asynchronous format (Section 13.2). When a bit-oriented format is selected (BSC/X.25, 7E/X.25, SDLC, or SDLC/NRZI), eight bits plus parity is invalid.

> NOTE: When 8 bits plus parity is selected, the Parameters 2 Enhance Parity selection and the trigger Mon Parer condition cannot be used.

13.2 FORMAT SELECTIONS

(a) Format (Lines 12 and 13). Essentially, the FORMAT selections on Lines 12 and 13 (Figures 13-3 to 13-6) program the INTERVIEW correctly for your protocol, and determine what choices are allowed in the following fields. To simplify programming, you are not shown unnecessary choices that could result in an "illegal" setup or could mislead you.

SYNChronous operation is the default FORMAT selection (Figure 13-3). You may accept the standard synchronization pattern in the next field (Line 14), or enter any nonstandard characters you wish. SYNC also permits you to choose OUTSYNC and AUTOSYNC.

Choose BSC/X.25 for BISYNC-framed X.25 (Figure 13-4). You may change the SYNC CHARS if necessary. AUTOSYNC and OUTSYNC will be available. For BSC/X.25, the string search capabilities of the unit are enhanced to ignore inserted DLE and DLE SYN (see Section 33.7).

7E/X.25 selects Bit-Oriented Protocols with HDLC framing (that is, 7E (hex) Flags, zero insertion) and data packet transmission, such as X.25 and BDLC. In these protocols, the synchronization Flag pattern and the conditions for OUTSYNC are always defined, so these selection fields will not appear (Figure 13-5).

SDLC selects IBM's SDLC-SNA; SDLC/NRZI picks SDLC with NonReturn-to-Zero encoding. As for 7E/X.25, synchronization is defined by the protocol so no other format lines are presented.

ASYNC, or asynchronous start-stop data, requires no other selections than the source of clock (Figure 13-6). With EXTernal clock, ASYNC operation is isochronous.

A DIP switch inside the case is used to choose between 1 and 2 stop bits. See Appendix J.4 for instructions.

(b) Synchronization Characters (Line 14). The SYNC CHARS data-entry field (see Figures 13-3 and 13-4) determines the synchronization pattern for synchronous data formats. The synchronization characters default to SY SY. In Run Mode, the code chart lookup is automatically performed: the proper SY character for the selected code is transmitted and (or) displayed in hexadecimal. The code chart lookup also obeys the parity selection; for example, the synchronization pattern in odd-parity ASCII is 16 16 (hex) but for even-parity ASCII it is automatically converted to 96 96 (hex). (See Table 13-1 for the default values of SY.)

Any other one- or two-character sequence may be entered, using alphanumeric keys, control characters, or hexadecimal. If the characters are entered in hexadecimal, then the selected code chart and parity selection will be ignored and the hexadecimal value entered will be used.

To select a one-character synchronization pattern, position the cursor on the SYNC CHARS line, depress CLEAR FIELD, and enter the desired character.

In Run Mode, the characters that the 4600 uses to find synchronization will not be displayed. Thus if a two-character synchronization pattern is selected, the first two synchronization characters received will not be displayed.

(c) Autosync (Line 14). AUTOSYNC (see Figure 13-3) allows the INTERVIEW to recognize a synchronization pattern at any time even though the receiver logic may "think" it is already in synchronization. AUTOSYNC should only be used with a two-character synchronization pattern. When AUTOSYNC is enabled, the logic constantly tests for the synchronization pattern on a bit-by-bit basis. When a match is found, it becomes the new reference point for character framing. AUTOSYNC thus eliminates the need to "bit shift" the data to find synchronization.

NOTE: If the 4600 does not go out of synchronization between transmissions, the two synchronization characters at the beginning of the next frame may be displayed as "garbage" characters. Because the number of bits between transmissions may not be an exact multiple of a character, the extra bits may cause the synchronization characters to be skewed and appear as garbage characters.

NOTE: Sometimes the synchronization pattern will appear and be detected within a data block. If this happens while AUTOSYNC is enabled, then the 4600 will resynchronize on this pattern and the rest of the block of data will be shifted. Odd-parity ASCII, for example, has several different character combinations that may appear within a data block and shift the rest of that block.

AUTOSYNC is extremely useful where there is no particular end of message character (OUT SYNC), or where one block of data follows another by less than a full character interval. AUTOSYNC will detect the synchronization pattern even though it is skewed from the previous block and display the following data correctly.

NOTE: If AUTOSYNC is on, the second synchronization character will not be displayed when the synchronization pattern is found.

(d) Outsync (Line 15). OUTSYNC (see Figure 13-3) causes a receiver to go out of synchronization if it finds the entered character in the data stream. Any character may be entered in the CHAR field. The number field (#) allows you to specify how many times the character must occur consecutively (from one to 255 times) before OUTSYNC occurs. Default condition for OUTSYNC is one FF (hex).

NOTE: A block check character may appear as FF (hex), and in transparent text there is the possibility that a legitimate data FF (hex) will occur. In such cases, it may be necessary to change the number of OUTSYNC characters or to use a trigger condition to force the 4600 out of synchronization.

TABLE 13-1

PARAMETERS RESULTING FROM CODE SELECTIONS

	Default			Other Choices	
Code	Info. Bits	Parity	SY1 SY2 (hex)	Info. Bits	Parity
EBCDIC	8	None	32 32	--	Even, Odd (Note 1)
ASCII	7	Odd	16 16 (Note 2)	8	Even, Odd (Note 1)
				7	Even, Mark, Space, None
EBCD	(6)	Odd	3D 3D (Note 3)	--	Even, Mark, Space, None
XS-3	(6)	Odd	35 35	--	----------
IPARS	(6)	(None)	3F 3E	--	----------
Rev. EBCD	(6)	Odd	1A 1A	--	Even, Mark, Space, None
Selectric	(6)	Odd	--	--	Even, Mark, Space, None
HEX	7	Odd	16 16	5,6,8	None (Note 4)
Baudot (Note 5)	(5)	(None)	--	--	----------

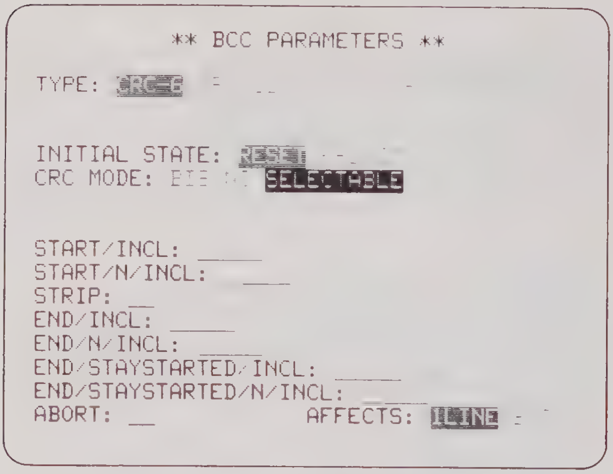
Note 1. Mark and Space are not valid selections for 8-bit codes plus parity. Eight bits plus parity is valid only for Synchronous and Asynchronous formats.

Note 2. Also applies to space parity and 8-bit ASCII. For even or mark parity ASCII, SY SY defaults to 96 96 (hex).

Note 3. Also applies to space parity EBCD. For even or mark parity AEBCD, SY SY defaults to 7D 7D (hex).

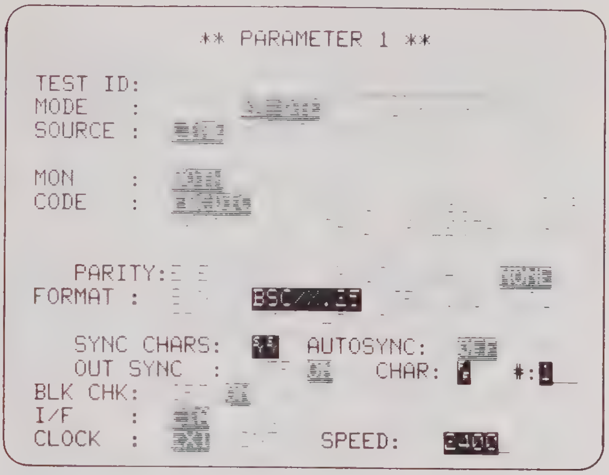
Note 4. While HEX is selected, if 5, 6, or 8 is selected for Info. Bits, Parity will remain NONE until the Code selection is altered.

Note 5. Baudot is available as an option.



```
            ** BCC PARAMETERS **

TYPE: [illegible]

INITIAL STATE: [illegible]
CRC MODE: [illegible] SELECTABLE


START/INCL: _____
START/N/INCL:  _____
STRIP: __
END/INCL: _____
END/N/INCL: _____
END/STAYSTARTED/INCL: _____
END/STAYSTARTED/N/INCL: _____
ABORT: __             AFFECTS: [illegible]
```

Figure 14-1 BCC Parameters menu in Selectable Mode lets you modify the BCC parameters.



```
                ** PARAMETER 1 **

TEST ID:
MODE    :      [illegible]
SOURCE  :  [illegible]

MON     :  [illegible]
CODE    :  [illegible]


   PARITY:                                  [illegible]
FORMAT  :          BSC/X.25

   SYNC CHARS: [illegible]  AUTOSYNC: [illegible]
   OUT SYNC  :    [illegible]   CHAR: [illegible]   #:[illegible]__
BLK CHK:    [illegible]
I/F     :  [illegible]
CLOCK   :  [illegible]        SPEED:    2400_
```

Figure 14-2 Block Check On/Off (line 16, Parameters 1 menu).

14
BLOCK CHECK CALCULATIONS

The INTERVIEW 4600 performs a variety of standard and nonstandard block check calculations on both received and transmitted data. You can test for unique applications by altering the parameters of the block check calculation on the BCC Parameters menu (Parameters 9; shown in Figure 14-1).

14.1 RECEIVED BLOCK CHECKING

Received block checking is enabled from line 16 of the Parameters 1 menu, BLK CHK: OFF ON (Figure 14-2). Actual control of the block check parameters is achieved from the BCC Parameters menu (Parameters 9).

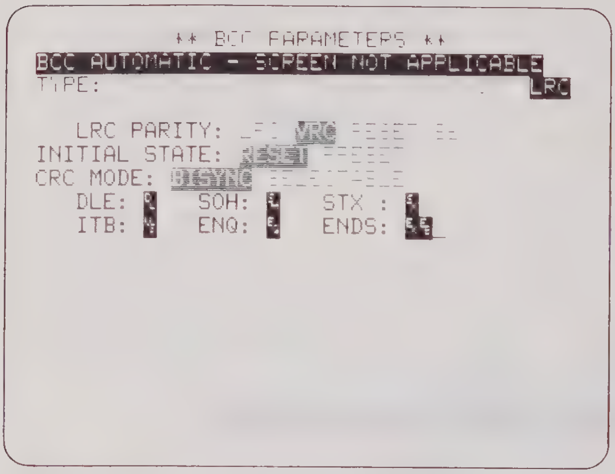
For some formats and codes, received BLK CHK does not appear on the Parameters 1 menu. Received block checking is automatically OFF if HEX or BAUDOT, neither of which supports block checking, is selected. Block checking is automatically ON for the formats that have well-defined block check sequences, namely, 7E/X.25, SDLC, SDLC/NRZI and DDCMP.

If the 4600 is acting as a high-speed monitor (H-SPD MON on Parameters 1 menu), received block checking is automatically ON for bit-oriented protocols (7E/X.25, SDLC, and SDLC/NRZI). Received block checking is automatically OFF for all other formats in high-speed monitor mode.

When received BLK CHK is OFF, the actual block check characters received by the 4600 on both TD and RD are displayed, but no calculations are performed on received data.

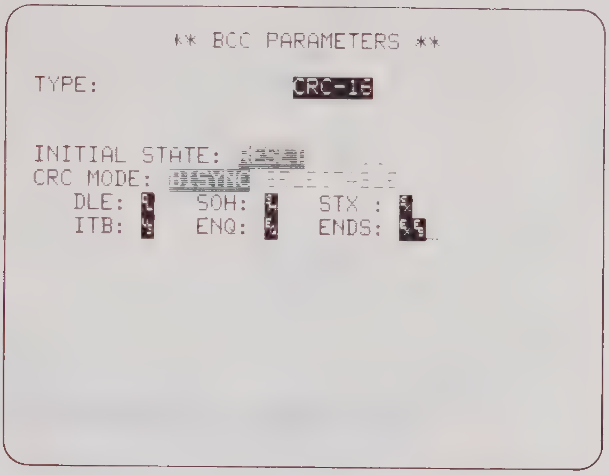
When received block checking is on, the 4600 performs block check calculations on all received data according to the parameters set on the BCC Parameters menu. When a block check is Good, a low-intensity reverse-image G is displayed in place of the last block check character; when a block check is Bad, a full-intensity reverse-image B is displayed.

The 4600 does not display Aborts except for 7E/X.25, SDLC, and SDLC/NRZI. For these formats, it displays a full-intensity, reverse-image A when it detects seven consecutive "1" bits.



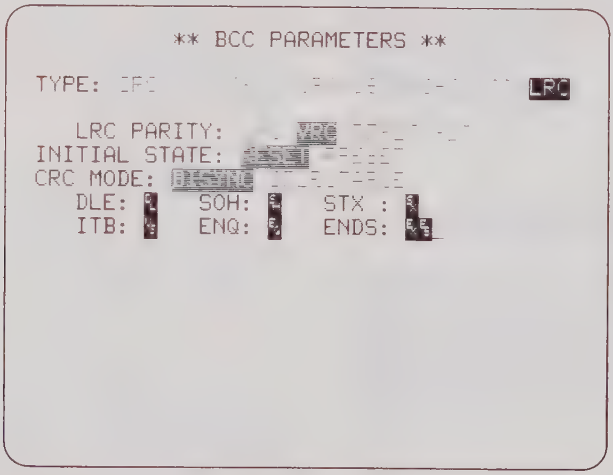
```
            ** BCC PARAMETERS **
BCC AUTOMATIC - SCREEN NOT APPLICABLE
TYPE:                                     LRC

   LRC PARITY:     VRC
INITIAL STATE: RESET
CRC MODE: BISYNC
   DLE:        SOH:        STX :
   ITB:        ENQ:        ENDS:
```

Figure 14-3 Default BCC Parameters Menu for Bit-Oriented Protocols.



```
            ** BCC PARAMETERS **

TYPE:                  CRC-16


INITIAL STATE: RESET
CRC MODE: BISYNC
   DLE:        SOH:        STX :
   ITB:        ENQ:        ENDS:
```

Figure 14-4 Default BCC Parameters Menu for EBCDIC code in SYNC or ASYNC Format.



```
            ** BCC PARAMETERS **

TYPE:                                     LRC

   LRC PARITY:     VRC
INITIAL STATE: RESET
CRC MODE: BISYNC
   DLE:        SOH:        STX :
   ITB:        ENQ:        ENDS:
```

Figure 14-5 Default BCC Parameters Menu for ASCII code in SYNC or ASYNC Format.

14.2 TRANSMITTED BLOCK CHECKING

Transmitted block checks are enabled on the Set Xmit line of the Trigger Conditions menus. If NO is selected, no transmitted block checks will be done. If a Trigger menu has been set to transmit block check characters, BCC characters will be transmitted in accordance with the parameters in effect on the BCC Parameters menu.

14.3 DEFAULT BLOCK CHECK CALCULATIONS

The 4600 automatically defaults to specific standard block check calculations depending on the code and format selections made on the Parameters 1 menu. Table 14-1 summarizes the default BCC settings for the various standard codes and formats supported by the INTERVIEW 4600.

The actual equations used by the 4600 in BCC calculations are defined in Table 14-2.

14.3.1 BSC/X.25, 7E/X.25, SDLC, and SDLC/NRZI Formats

For Bit-Oriented Protocols (SDLC, SDLC/NRZI, HDLC, and 7E/X.25), DDCMP, and BSC/X.25 the 4600 defaults to the BCC calculations standard for the format selected. The parameters for these calculations cannot be changed on the BCC parameters screen.

The screen displays the message "BCC AUTOMATIC - SCREEN NOT APPLICABLE" as shown in Figure 14-3. When this message is displayed, the parameters shown on the menu are not those actually used, and changing the selection on the screen has no effect on the BCC test being performed. Any changes made, however, stay on the screen and take effect if another format (such as ASYNC) is selected.

NOTE: Changing format selection has no effect on the BCC Parameters menu, but changing codes (from ASCII to EBCDIC, for example) will cause the BCC Parameters menu to display the default parameters for the new code.

14.3.2 SYNC and ASYNC Formats

When SYNC or ASYNC format is selected on Parameters 1, the 4600 will default into BISYNC or SELECTABLE CRC mode depending on the code selected in the Parameters 1 menu. Below are detailed the various default configurations found on the BCC Parameters menu for SYNC or ASYNC format.

(a) EBCDIC or ASCII Code. Selecting EBCDIC or ASCII code in SYNC or ASYNC format will result in the default parameters shown in Figures 14-4 and 14-5. Both EBCDIC and ASCII default into BISYNC CRC mode, but EBCDIC uses a CRC-16 calculation while ASCII uses an LRC calculation to determine BCC. You may redefine the values of the BCC control characters using alternate control characters, standard alphanumerics, or hexadecimal characters. You may also indicate the control character does not exist by leaving the field blank (see Section 14.5 on BISYNC CRC Mode Operation).

TABLE 14-1

INTERVIEW 4600 DEFAULT BLOCK CHECK CALCULATIONS

Code	Format	Is Screen Appl.?	Type	BCC Starts	BCC Resets on (Note 7)	Ignores (Strips from Calculations)	BCC Ends with	Aborts (No BCC)
EBCDIC	SYNC	YES	CRC-16	Defaults to BISYNC CRC Mode Operation See Section 14-5 on BISYNC CRC Mode Operation				
	ASYNC	YES	CRC-16					
	BSC/X.25	NO	---					
	BOPs (Note 1)	NO	---					
	DDCMP	NO	---					
ASCII	SYNC	YES	LRC	Defaults to BISYNC CRC Mode Operation See Section 14-5 on BISYNC CRC Mode Operation				
	ASYNC	YES	LRC					
	BSC/X.25	NO	---					
	BOPs (Note 1)	NO	---					
	DDCMP	NO	---					
Transmit: EBCD REV EBCD SELECTRIC (Note 2)	SYNC	YES	LRC	First text character	EOT (resets LRC) EBCD (3CH) R-EBCD(0FH) SEL (3CH)	# (at start of message) EBCD (34H) R-EBCD(0BH) SEL (30H)	ETB EBCD (5EH) R-EBCD(1EH) SEL (5EH)	EOT EBCD (3CH) R-EBCD(0FH) SEL (3CH)
	ASYNC	YES	LRC					
	BSC/X.25	NO	---					
	BOPs (Note 1)	NO	---					
	DDCMP	NO	---					
Receive: EBCD REV EBCD SELECTRIC (Note 3)	SYNC	YES	LRC	First text character (Note 4)	EOT EBCD (3CH) R-EBCD(0FH) SEL (3CH)	---	ETB EBCD (5EH) R-EBCD(1EH) SEL (5EH)	EOT EBCD (3CH) R-EBCD(0FH) SEL (3CH) (Note 5)
	ASYNC	YES	LRC					
	BSC/X.25	NO	---					
	BOPs (Note 1)	NO	---					
	DDCMP	NO	---					
XS-3	SYNC	YES	LRC	SOM (40H)	---	---	EOM (55H) (not included in BCC)	---
	ASYNC	YES	LRC					
	BSC/X.25	NO	---					
	BOPs (Note 1)	NO	---					
	DDCMP	NO	---					
IPARS	SYNC	YES	CRC-6	First bit after SY1 SY2 (3FH 3FH)	Next bit after CRC	---	EOM-PB(3DH) EOM-1 (0DH) EOM-C (1DH) EOM-U (2DH)	SY1 (3FH)
	ASYNC	YES	CRC-6					
	BSC/X.25	NO	---					
	BOPs (Note 1)	NO	---					
	DDCMP	NO	---					

(continued)

TABLE 14-1 (cont.)

Code	Format	Is Screen Appl.?	Type	BCC Starts	BCC Resets on (Note 7)	Ignores (Strips from Calculations)	BCC Ends with	Aborts (No BCC)
HEX	SYNC	NO		NO DEFAULT BCC				
	ASYNC	NO						
	BSC/X.25	NO						
	BOPs (Note 1)	NO						
	DDCMP	NO						
UT-200	SYNC	YES	LRC	SOH (01H) (Note 6)	---	SYN (16H)	ETX (03H)	---
	ASYNC	YES	LRC					
	BSC/X.25	NO	---					
	BOPs (Note 1)	NO	---					
	DDCMP	NO	---					
BAUDOT	SYNC			NO DEFAULT BCC				
	ASYNC							
	BSC/X.25							
	BOPs (Note 1)							
	DDCMP							

Note 1: BOPs = Bit Oriented Protocols, including: 7E/X.25, SDLC, SDLC/NRZI, HDLC

Note 2: Parity bit of LRC = LRC of all parity bits in transmission.

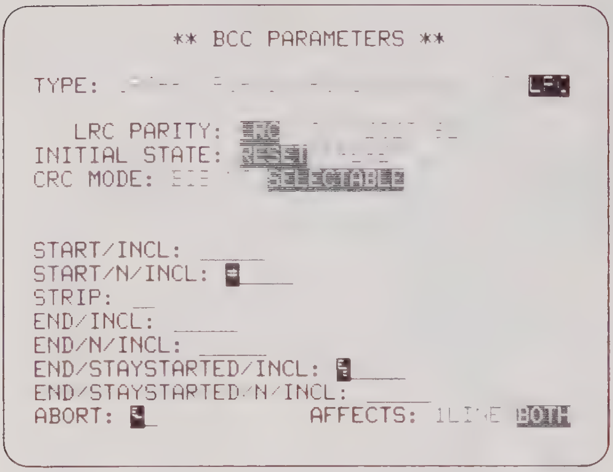
Note 3: LRC ignores parity bits.

Note 4: The bid character (#) at start of first transmission is not included in calculation, but thereafter all bid characters are included until an EOT is found.

Note 5: An EOT on one side of the line resets the other side of the line also.

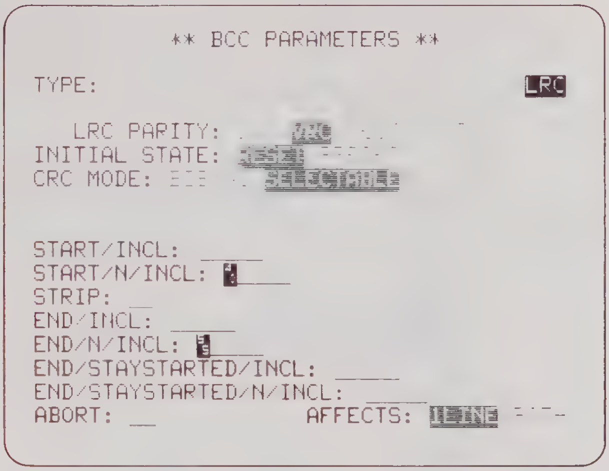
Note 6: Note: Initial State is Preset (all 1's).

Note 7: Calculations are reset whenever OUTSYNC or AUTOSYNC occurs.



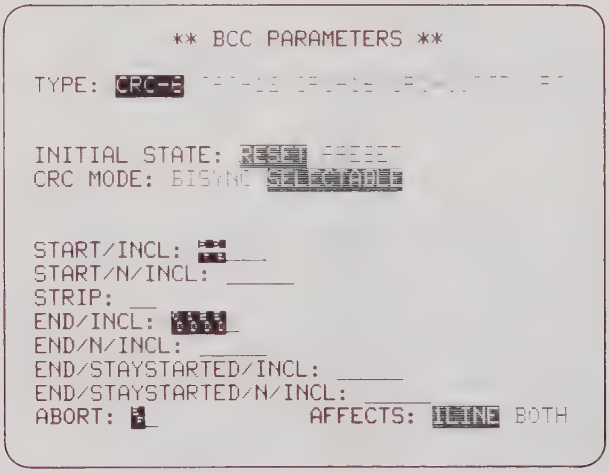
```
** BCC PARAMETERS **

TYPE: [illegible]                                 LRC

   LRC PARITY: [illegible]
INITIAL STATE: RESET
CRC MODE: [illegible] SELECTABLE


START/INCL: ______
START/N/INCL: [illegible]_____
STRIP: __
END/INCL: ______
END/N/INCL: ______
END/STAYSTARTED/INCL: [illegible]_____
END/STAYSTARTED/N/INCL: ______
ABORT: [illegible]_            AFFECTS: 1LINE BOTH
```

Figure 14-6 Default BCC Parameters Menu for EBCD, REVERSE EBCD, or SELECTRIC code in SYNC or ASYNC Format.



```
** BCC PARAMETERS **

TYPE:                                             LRC

   LRC PARITY: VRC
INITIAL STATE: RESET
CRC MODE: [illegible] SELECTABLE


START/INCL: ______
START/N/INCL: [illegible]_____
STRIP: __
END/INCL: ______
END/N/INCL: [illegible]_____
END/STAYSTARTED/INCL: ______
END/STAYSTARTED/N/INCL: ______
ABORT: __                      AFFECTS: 1LINE [illegible]
```

Figure 14-7 Default BCC Parameters Menu for XS-3 Code in SYNC or ASYNC Format.



```
** BCC PARAMETERS **

TYPE: CRC-6 [illegible]


INITIAL STATE: RESET PRESET
CRC MODE: BISYNC SELECTABLE


START/INCL: [illegible]___
START/N/INCL: ______
STRIP: __
END/INCL: [illegible]_
END/N/INCL: ______
END/STAYSTARTED/INCL: ______
END/STAYSTARTED/N/INCL: ______
ABORT: [illegible]_            AFFECTS: 1LINE BOTH
```

Figure 14-8 Default BCC Parameters Menu for IPARS Code in SYNC or ASYNC Format.

(b) EBCD, XS-3, REV EBCD, or SELECTRIC. Selecting EBCD, REV EBCD, or SELECTRIC code for SYNC or ASYNC format will result in the default BCC parameters shown in Figure 14-6. Selecting XS-3 for SYNC or ASYNC format will result in the default shown in Figure 14-7. All four codes default into SELECTABLE CRC mode and use an LRC calculation to determine BCCs. Any of the BCC parameters may be changed to meet specific applications.

(c) IPARS. Selecting IPARS code in SYNC or ASYNC format results in the default BCC parameters shown in Figure 14-8. IPARS defaults into SELECTABLE CRC mode and uses CRC-6 to calculate BCCs. Any of the BCC parameters may be changed to meet specific applications.

14.4 BCC PARAMETERS MENU FIELDS

The BCC Parameters Menu (Parameters 9) controls and displays the values of the 4600's block check parameters. These parameters are arrayed in 13 fields on the BCC menu. The meanings of the BCC parameter fields are found in Table 14-3.

Entries on the menu may be made in either alphanumeric or hexadecimal characters. In the START/INCL field only, characters may also be entered in the NOT EQUAL format.

14.5 BISYNC CRC MODE OPERATION

The INTERVIEW 4600 supports an expanded subset of IBM's "Binary Synchronous Control Procedures" (BISYNC), giving the 4600 greater flexibility in handling a wide variety of BISYNC applications.

In BISYNC CRC mode, you cannot specify whether control characters are included or excluded from the BCC calculation. You can, however, specify the values of the six BISYNC control characters (DLE, ITB, SOH, ENQ, STX, and ENDS) which appear on the BCC Parameters menu with default character values already assigned. The hexadecimal equivalents of these control characters may be found in the self-test chart for each code (see Section 8.4c). You may redefine the values of the BCC control characters using alternate control characters, standard alphanumerics, or hexadecimal characters. Clearing a field indicates that the control character does not exist. The ENDS field will designate up to three hexadecimal or control characters as END characters.

14.6 SELECTABLE CRC MODE

SELECTABLE CRC mode offers a much simpler default setup than BISYNC, but allows even greater user control over the BCC parameters.

A SELECTABLE CRC mode state diagram is presented in Figure 14-9. Notice there are only three states compared to the eight in BISYNC. In SELECTABLE CRC mode, however, you may choose multiple Start, End, Intermediate End, Strip, and Abort characters and indicate whether to include or exclude the characters in the BCC accumulation.

A typical BCC Parameters Menu in SELECTABLE CRC mode is illustrated in Figure 14-10. The menu supports up to two hexadecimal characters in the STRIP and ABORT fields, and up to five characters in each of the other fields.

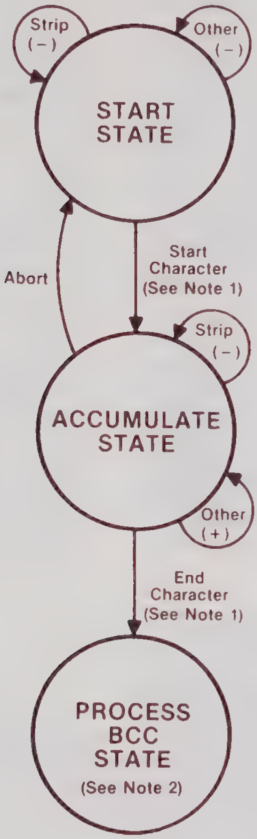


Figure 14-9 SELECTABLE MODE State Diagram:
(+) means the character is included in BCC calculation; (-) means the character is not included in BCC calculation.

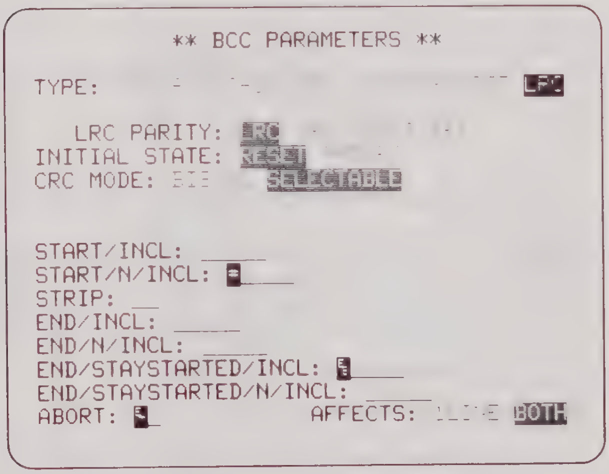
NOTE:

1. Any Start or End character can be either included in or excluded from BCC accumulation.

2. PROCESS BCC STATE does the following:
   a. Calculates and displays BCC result
   b. BCC remainder is reinitialized
   c. If end character was a STAYSTARTED character, returns to ACCUMULATE STATE.
   d. If end character was not a STAYSTARTED character, returns to START STATE.

Table 14-2
Block Check Polynomials

BCC Type	Block Check Polynomial
CRC-16	$X^{16} + X^{15} + X^2 + 1$
CRC-CITT	$X^{16} + X^{12} + X^5 + 1$
CRC-12	$X^{12} + X^{11} + X^3 + X^2 + X + 1$
CRC-6	$X^6 + X^5 + 1$



```
                ** BCC PARAMETERS **

TYPE:                                          LRC

   LRC PARITY: ERO
INITIAL STATE: RESET
CRC MODE:           SELECTABLE


START/INCL: ______
START/N/INCL: ______
STRIP: __
END/INCL: ______
END/N/INCL: ______
END/STAYSTARTED/INCL: ______
END/STAYSTARTED/N/INCL: ______
ABORT: _                  AFFECTS:        BOTH
```

Figure 14-10 BCC Parameters Menu in SELECTABLE Mode.

TABLE 14-3
BCC PARAMETERS MENU FIELDS

Line	Field	Meaning
2	(Messages)	All BCC Parameters messages to the operator are displayed on Line 2. See Appendix D for explanation of each message.
3	TYPE	Indicates method of BCC calculation selected. Polynomial expansions of each Type are listed in Table 14-2.
5	LRC PARITY	Displayed when TYPE: LRC is selected. Identifies how the LRC parity bit is being handled. LRC = the result of an LRC on the parity bits within the message VRC = the result of a VRC on the BCC character RESET = 0 SET = 1
6	INITIAL STATE	Sets initial state of block check character. RESET = all 0's PRESET = all 1's
7	CRC MODE	Allows choice between BISYNC and SELECTABLE CRC modes.
8,9	BISYNC control character fields	Data-entry fields displayed for BISYNC CRC Mode only. Allow you to alter the default values for protocol characters used by the INTERVIEW CRC logic. The default values are those standard for the code selected on the Parameters 1 menu. Alphanumeric, hexadecimal, and control characters are all legal.
10	START/INCL	Displayed when SELECTABLE is chosen. Identifies the character(s) on which 4600 initiates BCC accumulation, and includes the character(s) in the accumulation. For this field only, characters may be entered in either normal or NOT EQUAL format.
11	START/N/INCL	Displayed when SELECTABLE is chosen. Identifies the character(s) on which 4600 initiates BCC accumulation, and does not include the character(s) in the accumulation.
12	STRIP	Displayed when SELECTABLE is chosen. Identifies character(s) to be stripped from BCC accumulation.

(continued)

TABLE 14-3 (cont.)

Line	Field	Meaning
13	END/INCL	Displayed when SELECTABLE is chosen. Identifies the character(s) on which 4600 ends BCC accumulation, and includes the character(s) in the accumulation. Initiates processing of BCC. Returns to START State when processing is complete (see Figure 14-10).
14	END/N/INCL	Displayed when SELECTABLE is chosen. Identifies the character(s) on which 4600 ends BCC accumulation, and does not include the character(s) in the accumulation. Initiates processing of BCC. Returns to START State when processing is complete (see Figure 14-10).
15	END/STAYSTARTED/INCL	Displayed when SELECTABLE is chosen. Identifies the character(s) on which 4600 ends BCC accumulation, and includes the character(s) in the accumulation. Initiates processing of BCC. Returns to ACCUMULATE State when processing is complete (see Figure 14-10).
16	END/STAYSTARTED/N/INCL	Displayed when SELECTABLE is chosen. Identifies the character(s) on which 4600 ends BCC accumulation, but does not include the character(s) in the accumulation. Initiates processing of BCC. Returns to ACCUMULATE State when processing is complete (see Figure 14-10).
17	ABORT	Displayed when SELECTABLE is chosen. Identifies character(s) on which 4600 aborts BCC accumulation and returns to START State (See Figure 14-10). Indicates whether BCC accumulation has been aborted on one or both lines.

15

DATA SIGNAL CHARACTERISTICS

The last two lines of the Parameters 1 menu are for selecting data signal characteristics: EIA versus MIL-188, external versus internal clock, and data speed.

15.1 INTERFACE

EIA is the default selection. In this mode, the unit operates in accordance with the RS-232/V.24 standard. Select MIL to invert the TD and RD data signals for MIL-188 operation.

15.2 CLOCK

For SOURCE:LINE, this selection field is always displayed in the 4600. If clock is provided on the communication interface (RS-232/V.24 pins 15 and 17 or 24), EXTernal allows the INTERVIEW to use the external clock for the data receivers. The external clock must be a 1 x baud clock with the negative-going transition occurring at the middle of the data bit period. For cases where such clock is not provided, INTernal selects the INTERVIEW's internal clock logic, which regenerates clock information from the data.

(a) Emulate DCE. When EMulate DCE has been selected on the Parameters 1 menu, selecting INT CLOCK causes the INTERVIEW 4600 to drive pins 15 and 17; if EXT CLOCK is selected, the 4600 loops pin 24 to pins 15 and 17.

(b) Emulate DTE. When EM DTE has been selected on the Parameters 1 menu, selecting INT CLOCK causes the 4600 to put clock on pin 24. EXT CLOCK causes the 4600 to drive pin 24 to mark.

(c) Capture Memory. Clocking for the Capture Memory receivers must be selected on the Record Control menu (Parameters 2 menu).

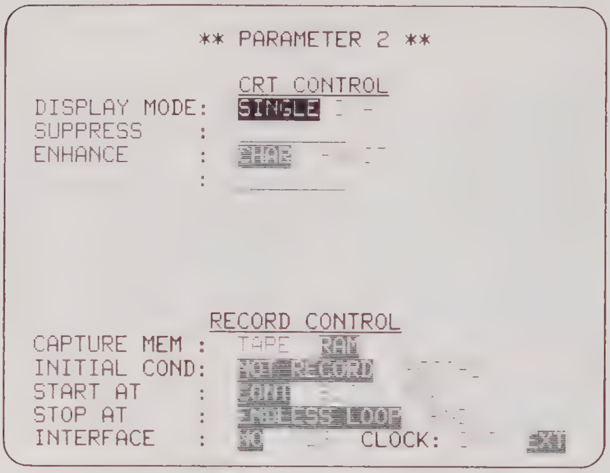
15.3 SPEED

Data signal SPEED may be entered using up to five digits or four digits and a decimal point. The actual speed generated internally is determined by dividing the speed entered into 57,600. The result is rounded to the nearest integer and becomes the clock divider value. The true internal speed is equal to the clock divider value divided into 57,600.

When INTernal CLOCK has been selected, the correct speed of the system being monitored must be entered here for clock information to be regenerated from the line data.

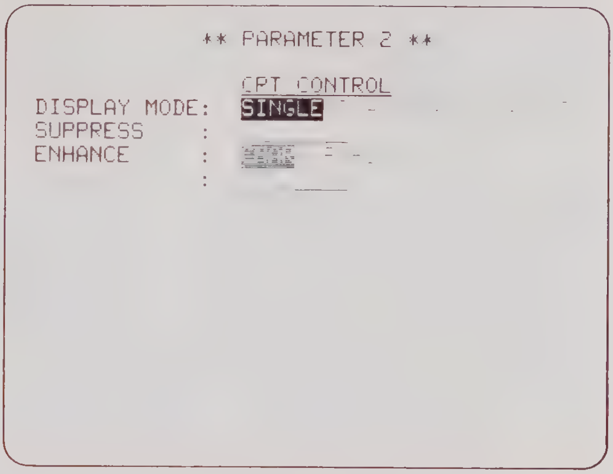
When the tape or RAM is being replayed, the speed entered determines the speed at which the data will be played back. The maximum speed for tape playback is 9.6 kbps; the maximum for recording data on tape is 19.2 kbps if RS-232/V.24 lead status is not being recorded and 9.6 kbps when RS-232/V.24 status is being recorded.

16. CRT DISPLAY CONTROL



```
               ** PARAMETER 2 **

                 CRT CONTROL
DISPLAY MODE:  SINGLE
SUPPRESS    :
ENHANCE     :  CHAR
            :


               RECORD CONTROL
CAPTURE MEM :  TAPE  RAM
INITIAL COND:  NOT RECORD
START AT    :  CONT
STOP AT     :  ENDLESS LOOP
INTERFACE   :  NO        CLOCK:       EXT
```

Figure 16-1



```
               ** PARAMETER 2 **

                 CPT CONTROL
DISPLAY MODE:  SINGLE
SUPPRESS    :
ENHANCE     :  CHAR
            :
```

Figure 16-2

16

CRT DISPLAY CONTROL

The CRT Control menu is on the Parameters 2 display. Other CRT enhancements can be controlled manually (see Sections 9 and 10) or by triggers (see Section 19.4).

16.1 DISPLAY MODE

There are four choices in the DISPLAY MODE field. To display data, select either SINGLE line or DUAL line (see Figure 16-1). These two display modes are described in Section 9.1.

(a) Single-Line Display. SINGLE line is the default selection. If BOTH has been selected for MONitor on the Parameters 1 menu, DCE and DTE data are displayed alternately on the same line.

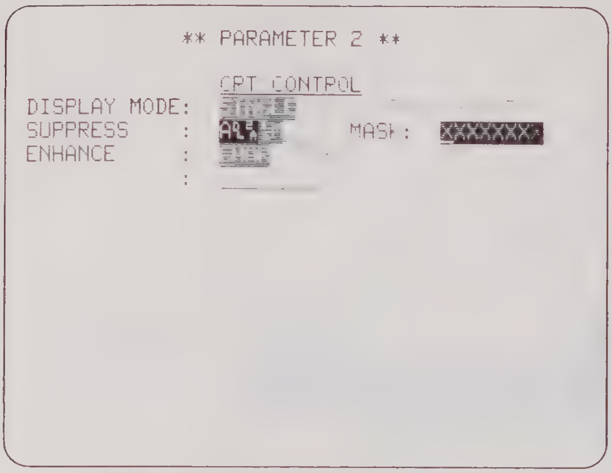
(b) Dual-Line Display. DUAL line maintains time correlation between DCE and DTE data. Dual-line display is useful for viewing simultaneous FDX data, but it should only be used when required because the single-line display uses the CRT and buffer space more efficiently.

> NOTE: Dual-line display should not be used at data rates above 19.2 kbps (H-SPD MON Mode). When dual line is used above 19.2 kbps, the unit may miss characters and may not maintain time correlation between TD and RD properly.

(c) Frame or Packet Protocol Display. Both FRAME and PACKET appear as Display Mode selections (Figure 16-2) only when TAPE or RAM has been selected as SOURCE and BSC/X.25 or 7E/X.25 as FORMAT on the Parameters 1 menu. Only FRAME appears for SDLC or SDLC/NRZI. When you select FRAME or PACKET, data will not be displayed in Run Mode. Instead, you will see a sequential display of frame-control or packet-type mnemonic expansions. See Section 34.3 for complete explanations of these displays.

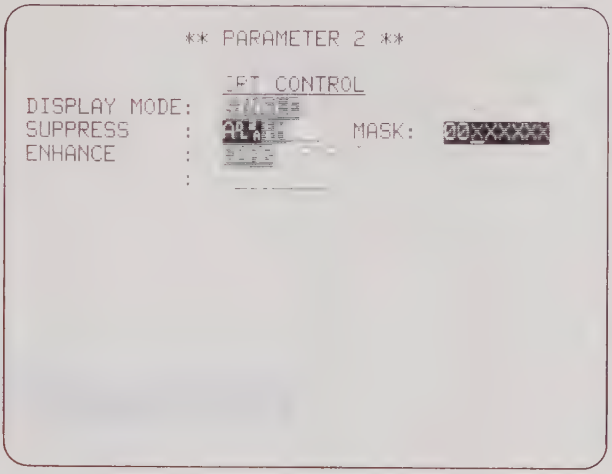
16.2 SUPPRESS

(a) Character List. For SINGLE- or DUAL-line display mode you may choose up to eight characters to be suppressed from the CRT display. The suppressed characters will not appear on the CRT or in the CRT buffer, which allows you to obtain a highly condensed, selective display. However, they will be received, considered by the triggers, included in counting and timing where applicable, and recorded if data is being recorded.



```
          ** PARAMETER 2 **

             CRT CONTROL
DISPLAY MODE: [illegible]
SUPPRESS    : [illegible]        MASK:  XXXXXXXX
ENHANCE     : [illegible]
            :
```

Figure 16-3



```
          ** PARAMETER 2 **

             CRT CONTROL
DISPLAY MODE: [illegible]
SUPPRESS    : [illegible]        MASK:  00XXXXXX
ENHANCE     : [illegible]
            :
```

Figure 16-4

The characters to be suppressed can be entered directly from the keyboard and may include --

- Upper- and lower-case alpha characters and numerals;
- Control characters;
- Hexadecimal entries;
- Flag bytes (CONTROL-FLAG; in 7E/X.25, SDLC, and SDLC/NRZI modes);
- One Bit Mask;
- All characters NOT EQUAL to a given character or bit mask.

Figure 16-3 shows an example of each type of entry in the Suppress field.

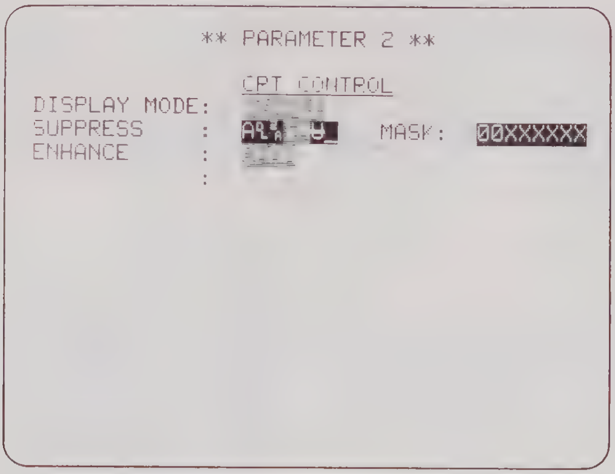
(b) Flag Byte. CONTROL-FLAG must be used for the 7E (hex) Flag in X.25 and SDLC protocols. The logic will not read HEX, 7, E as a Flag; in an information frame, this will be interpreted as a data 7E (hex).

(c) Bit Mask. With the cursor on the SUPPRESS line, press the red BIT MASK key. At the cursor position a low-intensity M will be entered, and at the right end of the line, MASK followed by an eight-place data-entry field will appear (see Figure 16-3). The cursor will be at the first place in this field.

Each X in the data-entry field represents one bit of an 8-bit character, with the low-order, first serial bit on the right. X's mean Don't Care. You may replace any of the X's with ones and (or) zeros. If, for instance, you enter 00 for bits 8 and 7, the pattern will now be 00XX XXXX. All characters having 00 for bits 8 and 7 will now be suppressed, as indicated by the low-intensity M in the list of suppressed characters (Figure 16-4). In EBCDIC all control characters have zeros for bits 7 and 8, so if the code selection were EBCDIC, all control characters would now be suppressed from the display.

> NOTE: A low-intensity character in a data-entry field always indicates that the character represents something other than itself.

To return to the SUPPRESS list, use ENTER. To get back to the MASK field, place the cursor on the mask position in the SUPPRESS list and press BIT MASK again.



```
                 ** PARAMETER 2 **

                    CPT CONTROL
DISPLAY MODE:       [illegible]
SUPPRESS     :      [illegible]         MASK:    00XXXXXX
ENHANCE      :      [illegible]
             :
```

Figure 16-5

Changing the code selection does not affect the number of bits displayed in the mask. If you have selected a code with less than eight information bits, say five, use the five lower-order (rightmost) bits and ignore the three excess higher-order bits.

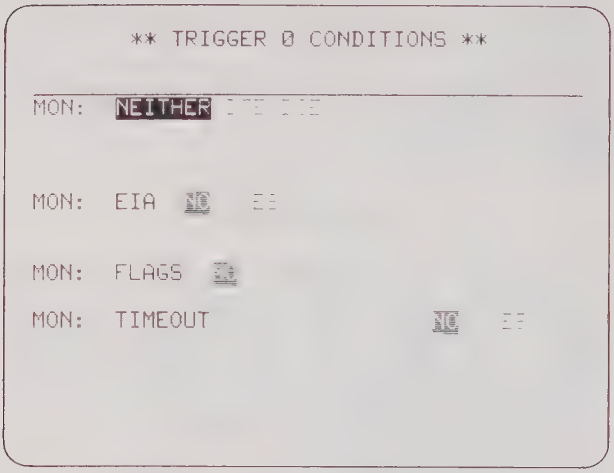
(d) Not Equal. You may suppress all characters not equal to any given character. To suppress all characters but U for example, press NOT EQUAL, then SHIFT-U. Figure 16-5 shows U displayed in the SUPPRESS list with a horizontal bar through it to indicate "not equal."

To suppress everything but characters that fit a certain bit mask, press NOT EQUAL, then BIT MASK. All characters that do not fit whatever pattern you then enter for the bit mask will be suppressed, and the low-intensity M in the SUPPRESS list will have a horizontal bar through it.

16.3 ENHANCE

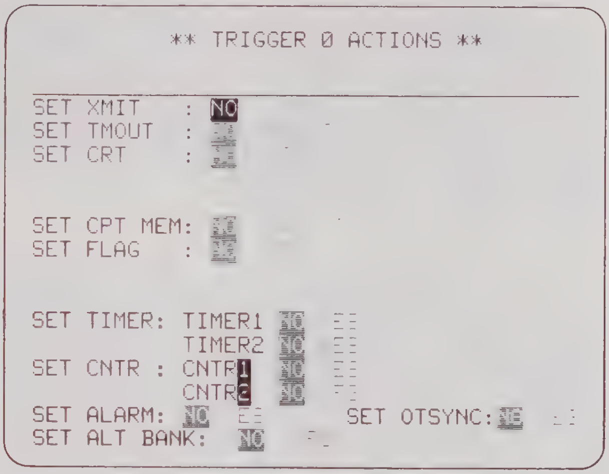
Enhanced characters will be displayed in blinking, bright, reverse image. If you select CHAR on the ENHANCE line, you may enter up to eight characters on the next line. Valid characters are the same as for SUPPRESS.

If you select ENHANCE PARITY, each character with a parity error will be displayed with a horizontal bar through it.



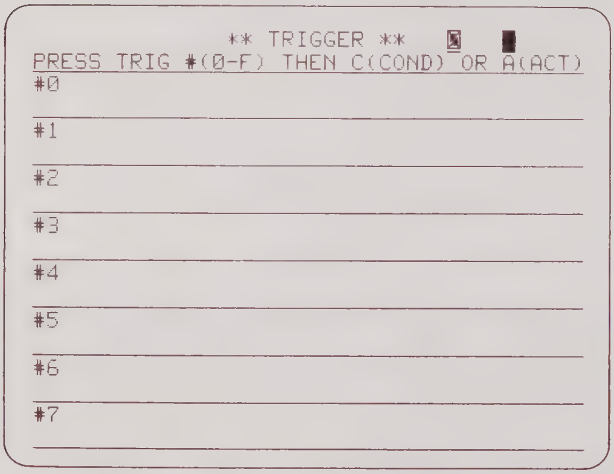
```
** TRIGGER 0 CONDITIONS **
______________________________________________
MON:   NEITHER


MON:   EIA  NO


MON:   FLAGS  NO

MON:   TIMEOUT                         NO
```

Figure 17-1



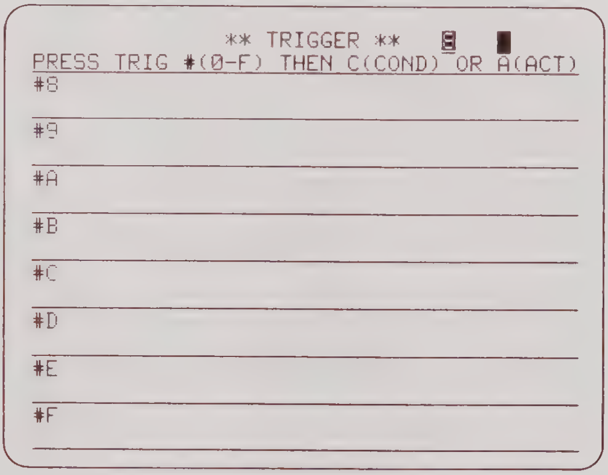
```
** TRIGGER 0 ACTIONS **
______________________________________________
SET XMIT    : NO
SET TMOUT   : NO
SET CRT     : NO


SET CPT MEM: NO
SET FLAG    : NO


SET TIMER: TIMER1 NO
           TIMER2 NO
SET CNTR : CNTR1  NO
           CNTR2  NO
SET ALARM: NO             SET OTSYNC:NO
SET ALT BANK: NO
```

Figure 17-2



```
        ** TRIGGER **   0   █
PRESS TRIG #(0-F) THEN C(COND) OR A(ACT)
#0
______________________________________________
#1
______________________________________________
#2
______________________________________________
#3
______________________________________________
#4
______________________________________________
#5
______________________________________________
#6
______________________________________________
#7
______________________________________________
```

Figure 17-3



```
        ** TRIGGER **   8   █
PRESS TRIG #(0-F) THEN C(COND) OR A(ACT)
#8
______________________________________________
#9
______________________________________________
#A
______________________________________________
#B
______________________________________________
#C
______________________________________________
#D
______________________________________________
#E
______________________________________________
#F
______________________________________________
```

Figure 17-4

17

TRIGGER MENUS: INTRODUCTION

The INTERVIEW 4600 employs the simple, nonsequential programming concept of Triggers: You specify what condition or combination of conditions you wish a trigger to look for, and what action or actions you wish it to take. The triggers in the 4600 are extremely powerful analytic tools not only because of the number of conditions and actions available, but also because there are 16 triggers and they can be linked.

17.1 CONDITIONS AND ACTIONS MENUS

The 16 triggers are designated by the hexadecimal numbers 0 through F. There are two menus for each trigger; an Actions menu and a Conditions menu.

To view the Trigger Conditions menu of, say, Trigger 0, press the red TRIGGER key, the number 0, and C in succession. This will give the display of Figure 17-1. To view the Trigger Actions menu of Trigger 0, press TRIGGER, 0, and A. The display will appear as in Figure 17-2.

While any Trigger Actions menu is displayed, you may see the Conditions menu for that trigger by pressing the CONTROL and ENTER keys simultaneously. While the Conditions menu is displayed, CONTROL-ENTER returns the Actions menu.

17.2 TRIGGER SUMMARIES

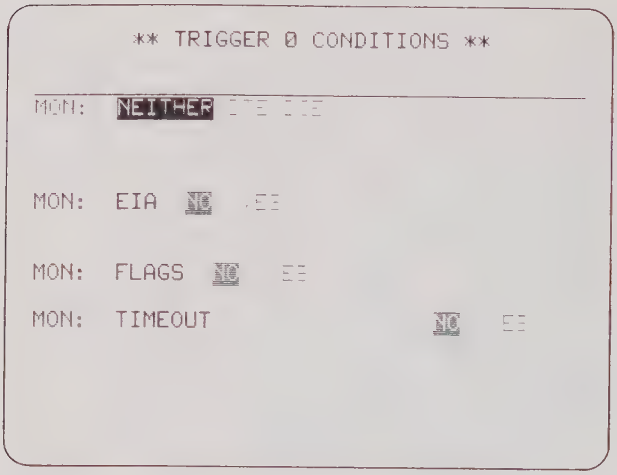
The 16 triggers are divided into two banks of eight, as may be seen from the Trigger Summary. To obtain the Trigger Summary, press the TRIGGER key. This immediately displays the summary of the first bank of eight triggers -- Triggers 0 through 7 (see Figure 17-3). Then, to see the second bank of eight, Triggers 8 through F (Figure 17-4), press the UP or DOWN cursor arrow. The UP or DOWN cursor arrow will return the first bank to the screen. (The Trigger Summary will be discussed in Section 20, after you have become familiar with trigger Actions and Conditions.)

While either bank of the Trigger Summary is displayed, you may select the Conditions or Actions menu for any trigger. First, enter the trigger number. The number you have selected will then be displayed on the first line of the summary after the heading TRIGGER. If you select a trigger number that is on the other bank of the summary, the other bank will automatically be displayed. Then you may press the C or the A key to display the desired Conditions or Actions menu. To see the Trigger Summary again, press TRIGGER. The display will return to the summary of the current bank.

17.3 ALTERNATE BANKS

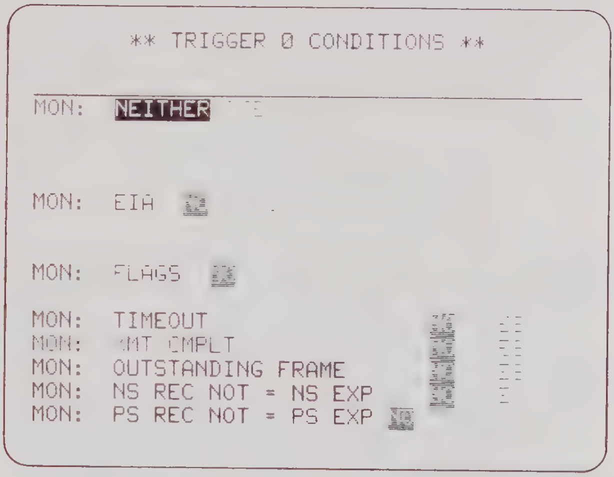
Functionally, as well as on the summary, triggers are grouped in two banks of 0 through 7 and 8 through F. Only one bank of triggers is active at any time, so you can divide a program into two segments. When the 4600 enters Run Mode, the low bank is initially active. In Section 19, you will see how to activate the second, or high, bank by selecting ALT BANK on an Actions menu.

18. TRIGGER CONDITIONS



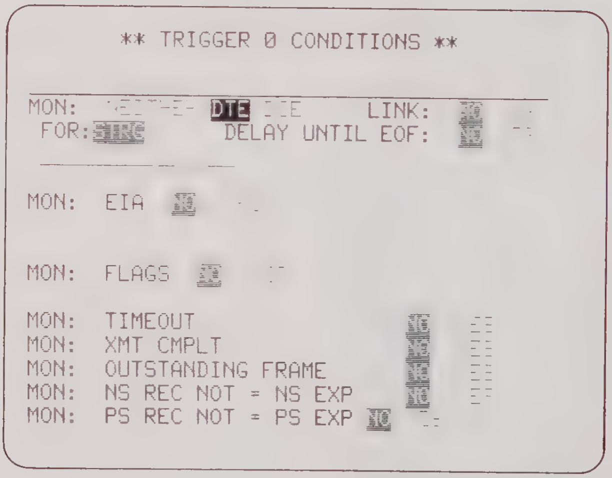
```
         ** TRIGGER 0 CONDITIONS **

MON:   NEITHER DTE DCE


MON:   EIA  NO  YES

MON:   FLAGS  NO   YES

MON:   TIMEOUT                       NO   YES
```

Figure 18-1



```
         ** TRIGGER 0 CONDITIONS **

MON:   NEITHER DTE


MON:   EIA  NO

MON:   FLAGS  NO

MON:   TIMEOUT                       NO   YES
MON:   XMT CMPLT                     NO   YES
MON:   OUTSTANDING FRAME             NO   YES
MON:   NS REC NOT = NS EXP           NO   YES
MON:   PS REC NOT = PS EXP NO
```

Figure 18-2



```
         ** TRIGGER 0 CONDITIONS **

MON:   NEITHER DTE DCE        LINK:        NO
 FOR:STRG          DELAY UNTIL EOF:        NO

MON:   EIA  NO

MON:   FLAGS  NO

MON:   TIMEOUT                       NO   YES
MON:   XMT CMPLT                     NO   YES
MON:   OUTSTANDING FRAME             NO   YES
MON:   NS REC NOT = NS EXP           NO   YES
MON:   PS REC NOT = PS EXP NO
```

Figure 18-3

18
TRIGGER CONDITIONS

18.1 INTRODUCTION

Each of the 16 triggers may look for any or all of seven conditions: specific characters or combinations of characters from either the DCE (RD) or DTE (TD), RS-232/V.24 lead status, status of eight internal flags, timeout of a special timer, completion of a transmission by the 4600, outstanding frame, and discrepancies in frame counts. For some Parameters 1 configurations, not all of these selections will be valid, and the invalid choices will not be displayed.

For a trigger to take action, all conditions selected for that trigger must be true.

Figure 18-1 shows the Trigger 0 Conditions menu for the default Parameters 1 menu; Figure 18-2 shows the same menu for Emulate Mode and 7E/X.25 format. The second and third lines are reserved for a summary of the Trigger 0 actions that have been selected. Similarly, the Actions menu includes a summary of the Conditions menu selections. After you are thoroughly familiar with the two trigger menus, you should look at the explanations of these two summaries in Section 20.

NOTE: In high-speed operation, the trigger conditions that can be used are limited. Please read Section 32 if you are using the INTERVIEW at data speeds above 19.2 kbps.

18.2 MONITOR

If you select NEITHER, data will not be used as a Trigger condition. If you select DTE, then TD (Pin 2) will be monitored for the condition selected on Line 5. Similarly, when you select DCE, RD (Pin 3) will be monitored for the condition selected on Line 5. In the Emulate Modes, it is possible to search for data in your own transmission as well as on the other line.

18.3 FOR

This selection field is actually a window on a rotating selection field (see Figure 18-3). It appears on Line 5 when either DTE or DCE has been selected on the preceding line. Table 18-1 shows the selections in this field. To use the window field, repeat the RIGHT cursor arrow to display each successive choice; or use the LEFT arrow to see the selections in the reverse sequence. Press the ENTER key to leave the field; the RIGHT or LEFT arrow will only change your selection.

TABLE 18-1
TRIGGER MONITOR CONDITIONS VS. FORMAT SELECTIONS

Format	Monitor Conditions
SYNC	STRG, 1 OF, PARER, GDBCC, BDBCC
BSC/X.25	STRG, 1 OF, PARER, GDBCC, BDBCC, FRAME, PACKET
7E/X.25	STRG, 1 OF, PARER, GDBCC, BDBCC, FRAME, PACKET, ABORT
SDLC, SDLC/NRZI	STRG, 1 OF, PARER, GDBCC, BDBCC, FRAME, ABORT
ASYNC	STRG, 1 OF, PARER, GDBCC, BDBCC

(a) String. The default selection is STRG, which allows you to enter a string of up to 16 characters on the following line. The entire, exact sequence of characters entered must be received for the condition to be true.

(b) "One of" Character. When "1 OF" is selected, the trigger looks for any one of the characters in the list of up to 16 characters entered in the next field.

(c) Parity Error. PARER selects PARity ERror as a trigger condition. The logic automatically computes parity in accordance with your selections under CODE on the Parameters 1 menu.

(d) Good or Bad Block Check. GDBCC (GooD Block Check Character) and BDBCC (BaD Block Check Character) cannot be used as conditions unless Received Block Check is on in the unit (Parameters 1 menu; see Section 14). Select GDBCC or BDBCC when you want the trigger to take action on receipt of the BCC. The 4600 does the appropriate type of block check calculation for the protocol entered on the Parameters 1 menu and compares it with the received block check characters. (See Table 14-1 for the block check calculations done by the INTERVIEW 4600.)

(e) Frame. This selection comes up for BSC/X.25, 7E/X.25, SDLC, or SDLC/NRZI. It enables you to look for a frame satisfying characteristics that you specify in the other fields on this line. Please see Section 33 (on Bit-Oriented Protocols) for detailed information about this Trigger Condition.

(f) Packet. This selection is displayed only for BSC/X.25 or 7E/X.25. You can use it to look for a packet satisfying specific conditions. Please see Section 33 for instructions on using this Condition.

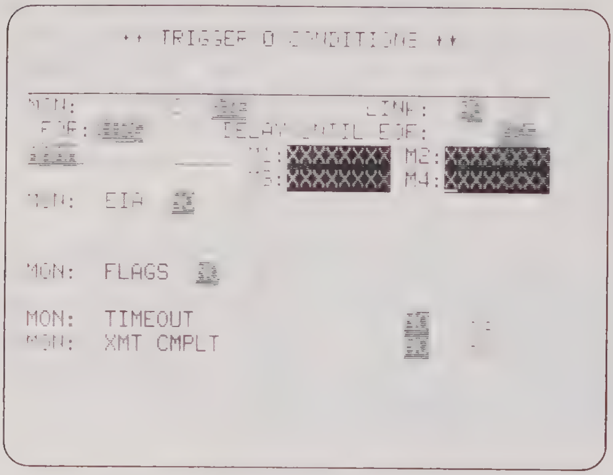
(g) Abort. For 7E/X.25, SDLC, or SDLC/NRZI, you can choose ABORT as a trigger condition. In 7E/X.25, seven consecutive 1's always constitute an ABORT. In SDLC or SDLC/NRZI, an ABORT can be received only during a frame, never during idle time.

18.4 CHARACTER-ENTRY FIELD

This field appears on Line 6 only if STRG or 1 OF has been selected on Line 5. It is the data-entry line for a character string, if STRG has been selected, or for a character list, if 1 OF has been selected. Up to 16 characters may be entered.

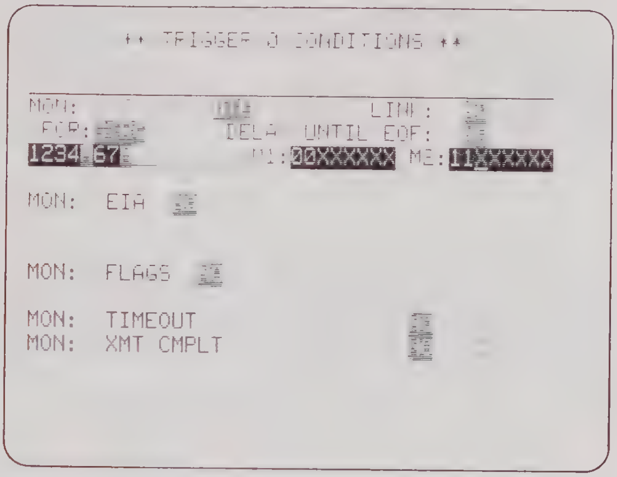
(a) String Entry. The 16 characters allowed in the string may include any of the following in any order or number:

- All upper and lower-case alpha characters and numerals on the keyboard.
- All control character mnemonics on the keyboard.
- Two-digit hexadecimal entries. These are entered by pressing the red HEX key followed by two blue alphanumeric keys in succession. Characters entered in hexadecimal are not translated and parity is not calculated for them.



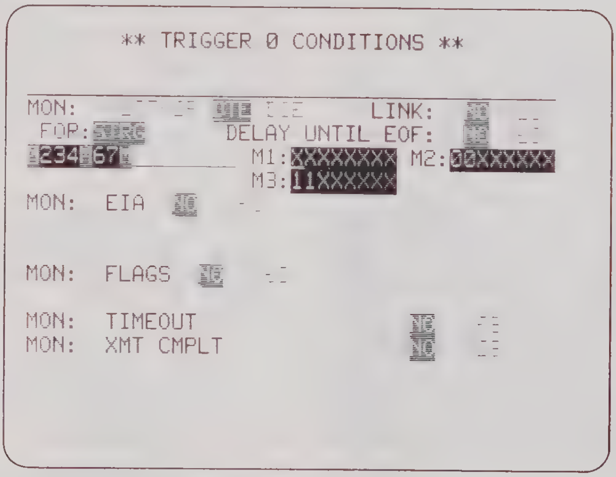
```
** TRIGGER 0 CONDITIONS **

MON:            [illegible]          LINK: [illegible]
 FOR:[illegible]     DELAY UNTIL EOF:        [illegible]
[illegible]                M1:XXXXXXXX M2:XXXXXXXX
                           M3:XXXXXXXX M4:XXXXXXXX
MON:  EIA [illegible]

MON:  FLAGS [illegible]

MON:  TIMEOUT                         [illegible]
MON:  XMT CMPLT                       [illegible]
```

Figure 18-4



```
** TRIGGER 0 CONDITIONS **

MON:            [illegible]          LINK: [illegible]
 FOR:[illegible]     DELAY UNTIL EOF: [illegible]
1234 67                    M1:00XXXXXX M2:11XXXXXX
MON:  EIA [illegible]

MON:  FLAGS [illegible]

MON:  TIMEOUT                         [illegible]
MON:  XMT CMPLT                       [illegible]
```

Figure 18-5



```
** TRIGGER 0 CONDITIONS **

MON:            [illegible]          LINK: [illegible]
 FOR:[illegible]     DELAY UNTIL EOF: [illegible]
1234 67                    M1:XXXXXXXX M2:00XXXXXX
                           M3:11XXXXXX
MON:  EIA [illegible]

MON:  FLAGS [illegible]

MON:  TIMEOUT                         [illegible]
MON:  XMT CMPLT                       [illegible]
```

Figure 18-6

- Flags. You must use CONTROL-FLAG key to enter the 7E (hex) Flag byte used in bit-oriented protocols. The logic will not read the key sequence HEX, 7, E as a Flag.

- Not Equal entries (explained in Section 16.2). When a character key is preceded by the NOT EQUAL key, all characters not equal to that character will satisfy that position in the string.

- Don't Care entries. The DON'T CARE key permits any character received in that position in the string to satisfy the condition.

- Four Bit Masks (Bit Masks are introduced in Section 16.2).

To enter a Bit Mask, use the BIT MASK key at the desired location in the string. Each time you press BIT MASK, a new mask field appears to the right of the string-entry field until you have used the maximum of four masks. The mask fields are numbered M1 through M4, to denote the order in which they appear in the string (Figure 18-4).

If you have used, for example, Bit Masks 1 and 2 at positions 5 and 8 of a string (as in Figure 18-5), you may decide to change the character at position 1 to a bit mask: Return the cursor to position 1 of the string and press BIT MASK. The character at position 1 will be overwritten with the low-intensity M, the two prior bit masks will be renumbered to 2 and 3, and their menu location shifted to make room for the new Bit Mask 1. The cursor will be at Bit 8 on the new mask. (Compare Figure 18-5 with Figure 18-6.)

To look for strings in transparent data in which the communications equipment inserts 0's or DLE's, please see Section 33.7.

(b) "1 OF" Character Entry. Up to 16 characters may be entered from the same list as for strings. The trigger will take action upon receipt of the first character to match any one in the list. If Don't Care is used, only one character should be entered. If all characters are entered as Not Equal, a match is found on each character that is not any one of the characters entered.

18.5 DELAY UNTIL END OF FRAME

When YES is selected for DELAY UNTIL EOF (on Line 5), the trigger will look for the string selected in the FOR field; if it matches the string, it then looks for the received block check calculation on the frame in which it found the match. If the block check is true,the trigger will consider the string received and will be true when any other conditions selected on that trigger are true. If the frame ends with a bad block check or is aborted, the string match will be considered not found, no actions will be taken, and the string search will begin again.

18.6 LINK

Triggers can be linked to increase the length of the string that a trigger will look for and the number of bit masks in a string, and to include BCC, "1 OF" characters, Frame, or Packet in the string.

When you select YES in the LINK field (on Line 4), the following trigger in numerical sequence is linked to the present trigger. If you wish, you may link all eight triggers in a bank in succession, but you cannot link a trigger in one bank to one in another bank. The default selection is LINK:NO.

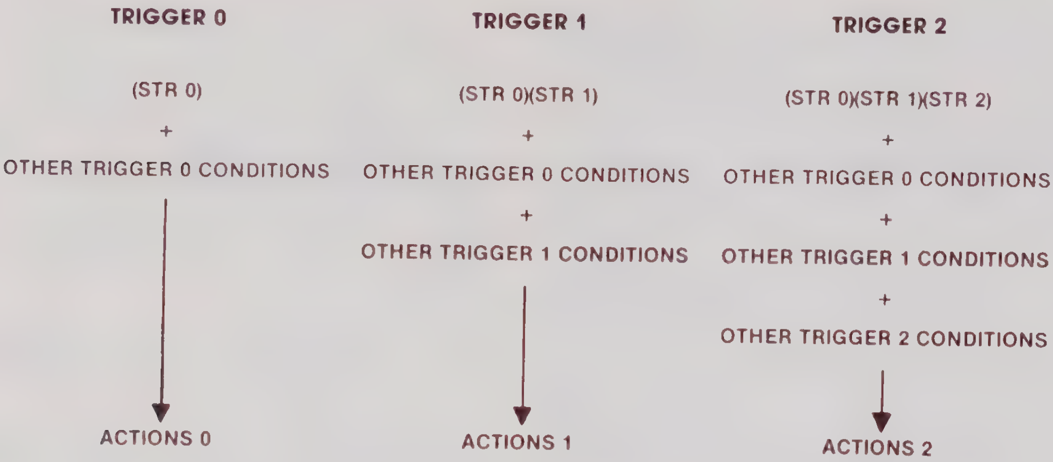

TRIGGER 0
(STR 0)
+
OTHER TRIGGER 0 CONDITIONS
ACTIONS 0
TRIGGER 1
(STR 0)(STR 1)
+
OTHER TRIGGER 0 CONDITIONS
+
OTHER TRIGGER 1 CONDITIONS
ACTIONS 1
TRIGGER 2
(STR 0)(STR 1)(STR 2)
+
OTHER TRIGGER 0 CONDITIONS
+
OTHER TRIGGER 1 CONDITIONS
+
OTHER TRIGGER 2 CONDITIONS
ACTIONS 2

Figure 18-7 Linked triggers.

(a) Bit Masks in Linked Strings. When a trigger is LINKed, 16 more character positions including four more bit masks may be added to the string by entering them on the next trigger. To enter a fifth Bit Mask at the end of a string -- whether or not you have filled all 16 positions on one trigger -- select the Conditions menu for the linked trigger; that is, the next trigger in numerical order. Enter a bit mask at the first string position. Fill in the bit mask field and press the ENTER key to return to the string-entry line on the linked trigger. Complete your string there. The software will ignore any empty positions at the end of the string-entry line of the preceding trigger and add the linked string directly to the last character on the preceding menu. To return to the previous trigger conditions, press TRIGGER followed by its number and C.

(b) Strings of More than 16 Characters. If you wish to enter a string of more than 16 characters, when the string is full simply select LINK and then the next trigger Conditions menu, and use the string capacity of the linked trigger.

(c) "1 OF" Character in a Linked String. At any position in a linked string, you can insert a character that is one of a list of characters by linking the next trigger and selecting 1 OF on its Conditions menu. The trigger will look for the first character satisfying the character list at that position in the string. To add any more characters to the string after a "1 OF" character, you must link another trigger.

(d) Block Check Characters in a Linked String. A good or bad block check character (GDBCC or BDBCC) may be used only as the first character in a linked string. It will be the only string character on the Conditions menu; succeeding characters must be entered on the next linked trigger.

(e) Frame or Packet in a Linked String. Either Frame or Packet can be used in a linked string. Please see Section 33 for definitions of the strings the 4600 looks for in these cases.

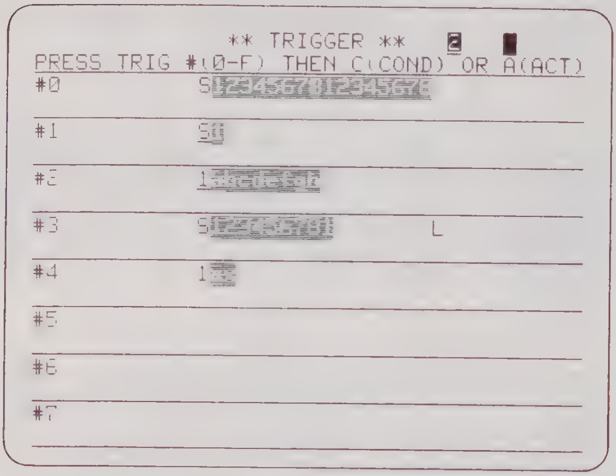
(f) Linked Trigger Actions. When triggers are linked, actions are taken in stepwise, cumulative fashion, as shown in Figure 18-7. If Triggers 0, 1, and 2 are linked, then Trigger 0 actions will occur as soon as Trigger 0 is true; Trigger 1 actions will occur when Triggers 0 and 1 conditions are true, and Trigger 2 actions will occur only when Triggers 0, 1, and 2 conditions are true. Thus you may select actions on any linked trigger, but only those on the last linked trigger will result from the trigger seeing the entire string.

(g) Other Conditions on Linked Triggers. You may include other trigger conditions (EIA status, internal flag status, and so on) on any linked trigger. These other conditions will be tested when the string segment accumulated through that trigger comes true (see Figure 18-7).

18.7 TRIGGER STRING CAPACITY

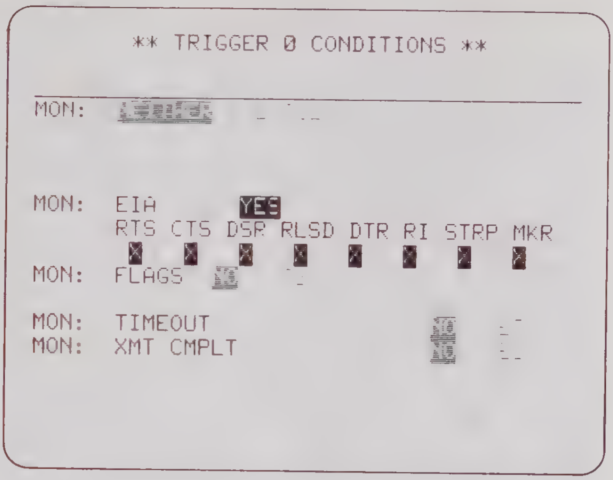
The maximum string capacity in the 4600, whether or not triggers are linked, is determined by number of string sets. A string set consists of one of the following:

- The first eight or the second eight string positions on a trigger;
- A single "1 OF" character set;
- One FRAME or PACKET selection.



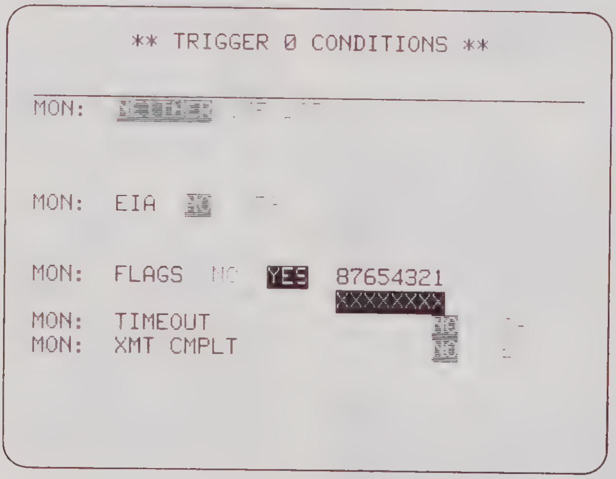
```
               ** TRIGGER **     2    █
PRESS TRIG #(0-F) THEN C(COND) OR A(ACT)
#0            S1234567812345678

#1            S0

#2            1ABCDEF

#3            S[illegible]               L

#4            1[illegible]

#5

#6

#7

```

Figure 18-8



```
       ** TRIGGER 0 CONDITIONS **

MON:   NEITHER


MON:   EIA        YES
       RTS CTS DSR RLSD DTR RI STRP MKR
        X   X   X   X    X   X   X   X
MON:   FLAGS  NO

MON:   TIMEOUT                 NO
MON:   XMT CMPLT               NO
```

Figure 18-9



```
       ** TRIGGER 0 CONDITIONS **

MON:   NEITHER


MON:   EIA  NO


MON:   FLAGS  NO  YES  87654321
                       XXXXXXXX
MON:   TIMEOUT                 NO
MON:   XMT CMPLT               NO
```

Figure 18-10

The maximum that may be used simultaneously in the unit is 20 string sets. Therefore, if you use either ten 16-character strings or eight 16-character strings, two 4-character strings, and two "1 OF" character sets, you have used the unit's 20-string set capacity. In Figure 18-8, seven of the possible 20 string sets have been used.

18.8 EIA

Select YES in the EIA field if you want a trigger to monitor status of the RS-232/V.24 leads or to look for a Marker (see Figure 18-9). In using the EIA condition, you should keep the following three points in mind. (1) If only EIA conditions are selected, the trigger will wait for all EIA conditions to be satisfied: it will become true upon the the last transition necessary to satisfy these conditions. (2) If a MON DTE or DCE condition, such as a string, is also selected, the trigger will be true if it sees the specified pattern of EIA lead status at the time the MON condition is satisfied. (3) For MON:NEITHER, if other conditions are selected with EIA, the trigger will be true if the other conditions are true at the time of the last transition necessary to satisfy the EIA conditions.

(a) RS-232/V.24 Leads. In Line 10, enter a 1 in the box under a lead to indicate ON; a 0 for OFF. No entry (X) is read as Don't Care. Entry fields are provided for six leads: RTS (Pin 4), CTS (Pin 5), DSR (Pin 6), DTR (Pin 20), RLSD (Pin 8), and RI (Pin 22). You may monitor a seventh RS-232/ V.24 lead by strapping the desired lead and selecting STRaP on the menu. See Appendix J.5 for strapping instructions.

(b) Marker; Manual Program Control. When you select MKR, the trigger will sense the status of the ENTER key. This effectively gives you manual control of trigger actions, for the conditions will not be true until you press (or release) the ENTER key in Run Mode.

18.9 FLAGS

There are eight internal flags in the INTERVIEW 4600 and they all may be monitored by one trigger, or all set by one trigger, or monitored and set by any combination of triggers. All flags are set to 0 when the 4600 enters Run Mode or if the RUN key is pressed when the unit is already in Run Mode. To test internal flags, select YES in the FLAGS field (see Figure 18-10). In the flag mask on the next line, enter a 1 to test for a flag ON, a 0 to test for a flag OFF, or X for Don't Care.

If a FLAG condition is used with a string or character-type condition, then the flag is tested when the entire string has come true. The flag condition is not tested on each character of the string.

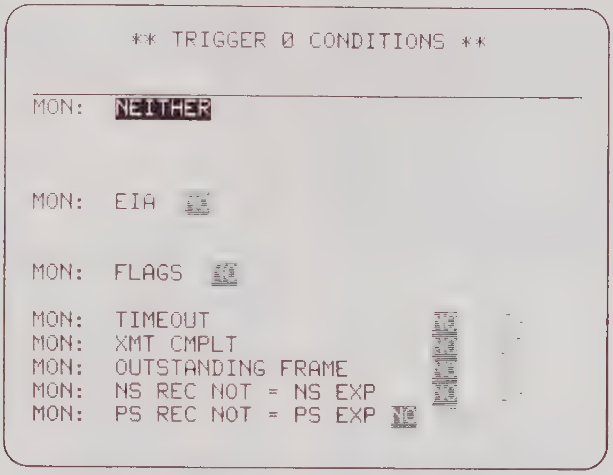
The 4600 can store the states of the internal flags when it exits Run Mode. On the Parameters 4 menu (Section 28) select MAINTAIN for LEAD STATUS EXITING RUN. This allows you to interrupt a test in progress by pressing the PROGRAM key, make changes in the program, and then resume the test. The trigger program will continue from where it left off when the 4600 exited Run Mode.

18.10 TIMEOUT

When TIMEOUT YES is selected, the trigger looks for the timeout set by another trigger to occur (see Section 19.3). The default selection is NO.

18.11 TRANSMISSION COMPLETE

The XMT CMPLT field appears only if you have selected one of the Emulate Modes on the Parameters 1 menu. The



```
          ** TRIGGER 0 CONDITIONS **

MON:   NEITHER


MON:   EIA  NO


MON:   FLAGS  NO

MON:   TIMEOUT                  NO
MON:   XMT CMPLT                NO
MON:   OUTSTANDING FRAME        NO
MON:   NS REC NOT = NS EXP      NO
MON:   PS REC NOT = PS EXP NO
```

Figure 18-11

default choice is OFF. When YES is selected the trigger looks for the end of a transmission by the 4600. The XMIT CMPLT condition usually should be used with another condition to control when, or how many times, it will be tested. See Section 31.4 for more explanation of this condition.

18.12 OUTSTANDING FRAME

This selection (Figure 18-11) only appears if BSC/X.25, 7E/X.25, SDLC, or SDLC/NRZI has been selected on the Parameters 1 menu. The default choice is NO. Select YES if you want a trigger action whenever there is an outstanding frame.

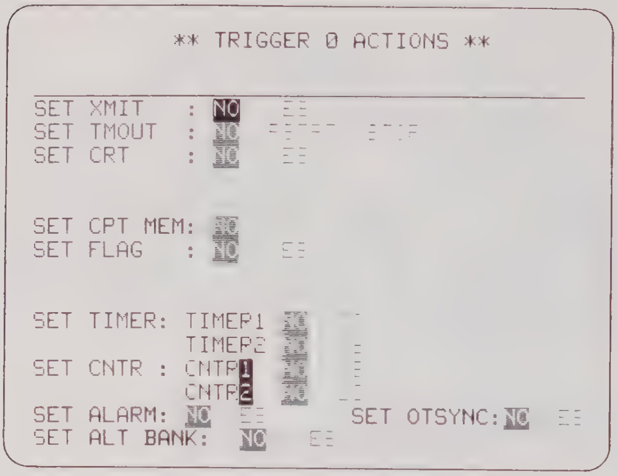
See Section 35.10 for a more complete discussion of this condition.

18.13 NS REC NOT = NS EXP

This condition (Figure 18-11) appears only for BSC/X.25, 7E/X.25, SDLC, and SDLC/NRZI. It is true when the Number Sent Count Received does not equal the Number Sent Count Expected. The default choice is NO. See Section 35.10 for a more complete discussion of this condition.

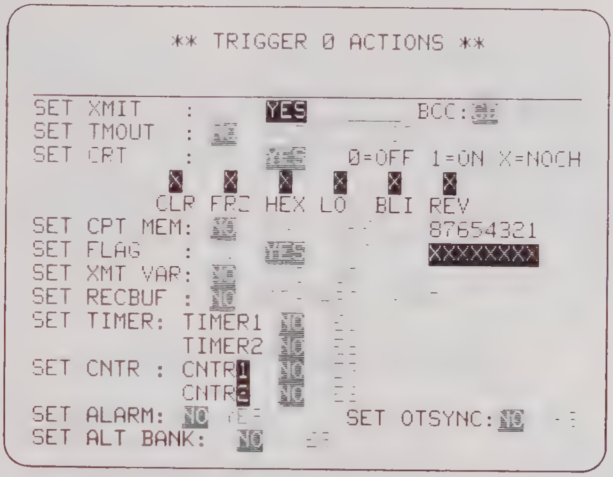
18.14 PS REC NOT = PS EXP

This condition (Figure 18-11) comes up only for BSC/X.25 and 7E/X.25. It monitors the packet sequence count in the same fashion as the preceding condition monitors frame sequence count. Please see Section 35.10 for more about this condition.



```
          ** TRIGGER 0 ACTIONS **
SET XMIT    : NO
SET TMOUT   : NO
SET CRT     : NO


SET CPT MEM: NO
SET FLAG    : NO


SET TIMER: TIMER1 NO
           TIMER2 NO
SET CNTR : CNTR1  NO
           CNTR2  NO
SET ALARM: NO          SET OTSYNC:NO
SET ALT BANK:  NO
```

Figure 19-1



```
          ** TRIGGER 0 ACTIONS **
SET XMIT    :     YES       BCC:NO
SET TMOUT   : NO
SET CRT     :     YES   0=OFF 1=ON X=NOCH
              X    X    X    X    X    X
            CLR  FRZ  HEX  LO   BLI  REV
SET CPT MEM: NO                   87654321
SET FLAG    :     YES             XXXXXXXX
SET XMT VAR: NO
SET RECBUF : NO
SET TIMER: TIMER1 NO
           TIMER2 NO
SET CNTR : CNTR1  NO
           CNTR2  NO
SET ALARM: NO          SET OTSYNC:NO
SET ALT BANK:  NO
```

Figure 19-2

19
TRIGGER ACTIONS

REMINDER: To go to the Actions menu of a trigger while its Conditions menu is displayed, press CONTROL-ENTER.

19.1 INTRODUCTION

Figure 19-1 is a trigger Actions menu as it appears for default parameters; Figure 19-2 shows the same menu with all actions displayed.

Any combination of trigger Actions may be set to take effect when all conditions selected for that trigger are true. More than one trigger has access to the same action. For example, a counter may be used to count characters from DTE on one trigger and characters from DCE on another trigger. The counter will register the total number of characters in both directions.

When you select YES for a trigger action, the action criteria are presented. If you then select NO, the criteria you have selected will disappear from the display, but remain dormant in the unit. When the program is recorded, the dormant choices will also be saved on the tape for future use. These choices will reappear if YES is again selected. They can be cleared, and the entire trigger returned to the default (OFF) state, by CONTROL-CLEAR FIELD.

At data speeds up to 9600 bps, all trigger actions occur within the next received character time. As the speed is increased up to 72 kbps, the number and complexity of triggers that can be used is reduced. Trigger efficiency is also influenced by the type of data.

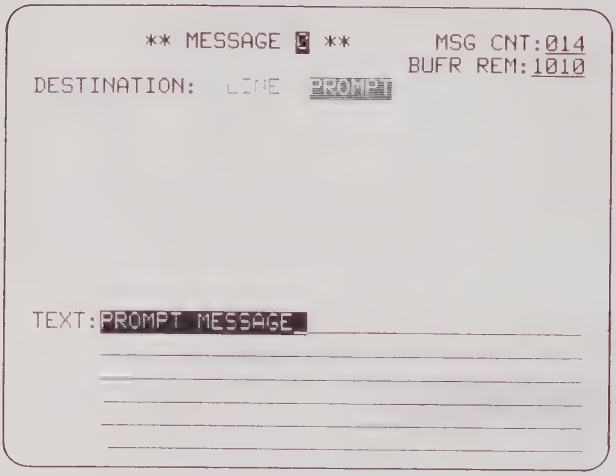
Trigger timing and sequencing are explained in detail in Section 21; trigger function in high-speed operation is discussed in Section 32.

The second and third lines of each trigger Actions menu are a summary of the selections on the Trigger Conditions menu. This summary is explained in Section 20.

19.2 SET TRANSMIT

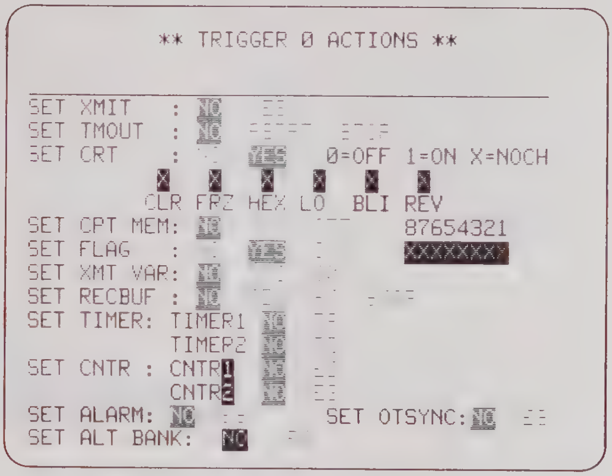
(a) Transmissions. This action controls the 4600's transmitter. Its use for this purpose is explained in Section 31 (Transmission Control).

(b) Prompts. Set Xmit is also used to display Prompts -- messages to the operator -- on the second line of the CRT data display in either Monitor Mode or the Emulate Modes.



```
        ** MESSAGE 5 **          MSG CNT:014
                                 BUFR REM:1010
 DESTINATION:  LINE  PROMPT



 TEXT:PROMPT MESSAGE_
```

Figure 19-3



```
            ** TRIGGER 0 ACTIONS **

SET XMIT    : NO
SET TMOUT   : NO
SET CRT     :     YES   0=OFF 1=ON X=NOCH
                X   X   X   X   X   X
               CLR FRZ HEX LO  BLI REV
SET CPT MEM: NO                87654321
SET FLAG    :     YES          XXXXXXXY
SET XMT VAR: NO
SET RECBUF : NO
SET TIMER: TIMER1 NO
           TIMER2 NO
SET CNTR : CNTR1  NO
           CNTR2  NO
SET ALARM: NO          SET OTSYNC:NO
SET ALT BANK:  NO
```

Figure 19-4

To enter the text of a Prompt, display one of the 4600's 16 Message-Entry menus by pressing the MESSAGE key followed by any digit from 0 to F (see Figure 19-3). Select PROMPT on Line 3; then type your message into the TEXT area. The maximum Prompt message is 40 characters because it must fit on one line of the CRT. If you enter too many characters, the first 40 will be displayed and the overflow dropped. Hexadecimal characters should not be used: the 4600 will display hexadecimal characters in their ASCII equivalent regardless of what code has been chosen on the Parameters 1 menu.

To display the Prompt, enter the number of the Message-Entry menu in the Set Xmit field of the Trigger menu. One prompt is permitted per trigger; if you enter more than one, only the last one will be displayed. The Prompt will not be transmitted on RD or TD, but will be routed directly to the CRT. You can include a Prompt in a list of messages to be transmitted (see Section 31), and the 4600 will display the Prompt immediately upon trigger true without waiting for the preceding messages in the list to be transmitted.

In Run Mode, the Prompt is displayed until it is replaced by another prompt, or you clear it from the CRT by pressing the CLEAR FIELD key.

Prompts are very useful in program development because you can use a Prompt to tell you when a trigger is true.

19.3 SET TIMEOUT

The INTERVIEW 4600 has a timer dedicated to the timeout function; that is, a timer whose final reading may be used as a trigger condition. Select the duration of the timeout on the Statistics menu (see Section 19.14). The maximum value for a single timeout is 6800 milliseconds. However, it is possible to obtain longer timeouts by using the flags to look for multiple occurrences of the timeout. The maximum is 256 X 6800 msec or approximately 29 minutes.

RESTART: When RSTRT is selected, the trigger resets the timeout timer to 0 and it begins to increment.

STOP: When STOP is selected, the trigger stops the timer, and the timeout condition does not occur.

The default selection is NO.

19.4 SET CRT

Triggers can be used to selectively enhance or display specific data on the CRT. Control of the CRT is independent of the tape or counters or timers. Data withheld from the CRT while it is frozen is still available to be recorded and counted. The 640-character display and the 1920-character display buffer are controlled together.

To turn a CRT action ON (see Figure 19-4), enter a numeral 1 in the corresponding box on Line 7; to turn an action OFF, enter a zero (0). An X means that no action will be taken.

(a) Clear. When CLR is selected, the trigger clears the entire CRT display and the 1920-character buffer. The process takes 20 milliseconds, during which all received data is lost to the CRT display. CLEAR is automatically reset to OFF when the clearing process is complete, so it is not necessary to use another trigger to turn CLEAR off.

(b) Freeze. When FRZ is on, no new data is received by the CRT buffer or displayed until freeze is turned off. Freeze may be turned on or off by another trigger or manually. When a trigger freezes the display, the TRIGGER and FREEZE indicators on the status panel go on. If the display has been frozen manually, the MANUAL and FREEZE indicators go on. In the latter case, trigger control can be restored only by operating the RESUME TRIGGER key in the CRT Control zone of the keyboard.

(c) Hexadecimal. When HEX is enabled, all data received after the trigger is true is displayed in hexadecimal. Once data is received in the CRT buffer under trigger control as hexadecimal, it remains in hexadecimal.

(d) Low Intensity. LOw intensity is useful to display data of lesser importance. However, in combination with reverse image, it creates a highlight that is immediately noticeable.

(e) Blink. BLInk is useful to call attention to small portions of data. In combination with reverse image it gives the most conspicuous highlight. Blink cannot be reset or overridden from the keyboard.

(f) Reverse Image. Reverse-imaged characters are presented in black on a white background. REVerse image is very effective when used in combination with low intensity, but hard to read if used over a large area of the screen.

19.5 SET CAPTURE MEMORY

This selection starts (ON) and stops (OFF) data recording (or playback). All other recording parameters are controlled from the Parameters 2 menu. See Section 23 for a complete discussion of data recording with the 4600.

> NOTE: On the Set Flag, Timer, and Counter lines, remember to use the ENTER key to move the cursor to the number and action fields to avoid altering your selections.

19.6 SET FLAG

Flags are bits that can be set on or off by triggers. The default selection is NO.

(a) Specifying a Flag Mask. When YES is selected (see Figure 19-4), a mask of eight numbered boxes appears at the right. Use the ENTER key to move the cursor to this field. Enter a 1 under the number of any flag, or flags, that you wish turned on; a 0 for any flag, or flags, you wish turned off. X means Don't Care: the trigger will not change the status of this flag. The trigger action will be to set the flags according to the mask you have entered. The initial flag status when the 4600 enters Run Mode is all flags OFF.

(b) Incrementing the Flag Mask. INCrement is the alternate choice when YES is selected. Increment can be used to control recursive routines. Each time the trigger conditions are satisfied, the value of the flag mask, considered as a binary number, will increment by one. To reset Flag Increment, use the flag mask action (a).

> NOTE: The high-order bit is on the left (Flag 8); the low-order bit on the right (Flag 1).

(c) Auxiliary Outputs. Flags 6, 7, and 8 cause outputs on pins 11, 9, and 4, respectively, of the 4600's auxiliary connector to change state, following the status of the flags. When the flag is set to 1, the output will be +3.5 volts and when the flag is set to 0, the output will be at ground. The output driver is a 74LS04, which can sink up to 8 mA. Ground on the connector is on pins 7, 8, 15, and 14.

19.7 SET TRANSMIT VARIABLE

This field appears on the trigger menu only when one of the Emulate Modes has been chosen on the Paramters 1 menu. The SET XMIT VAR field controls a 1-byte counter whose output can be transmitted by triggers. See Section 35.10 (Bit-Oriented Protocols) for a complete explanation.

19.8 SET RECEIVE BUFFER

This field also appears only when an Emulate Mode has been chosen. Sections 30.5 and 31.3 explain how to load the Receive Buffer with received data and then transmit its contents.

19.9 SET TIMER

There are two timers, both of which can be controlled by the same trigger. (A separate timeout timer is also available; see Section 19.3.) The default selection is NO. When YES is selected for either timer, three more choices appear (Figure 19-5):

ReSTaRT causes the selected timer to reset to 0 and begin counting. Before a timer is reset by a trigger, the current value is transferred to the LAST column on the Results display.

CONTinue causes a timer to begin counting by adding to the existing count.

STOP causes the timer to stop. The timer value will be displayed in the CURRENT column of the RESULTS display until the next ReSTaRT or CONTinue takes effect or you intervene manually. (Timers can be reset in Run Mode; see Section 8.3.)

The maximum value for each timer is 65,535. When this is exceeded, OVerFLOw appears on the Results display.

Timer resolution is selected on the Statistics menu (see Section 19.14) as seconds or milliseconds. The timers may also be named on the Statistics menu.

> NOTE: When 1 second is used for the count increment and the durations are less than 1 second, a rounding effect occurs, where some shorter periods are missed and others counted. This effect will usually average out for counts above 100. Since the 1-second timebase runs continuously and is not initialized for each measurement, the accuracy of measurements will always be plus or minus 1 second.

> NOTE: Remember that in tape playback mode, the timer readings are valid only if the data is played back at the original line speed. Otherwise, a correction must be made: for instance, 2 ms at 4800-bps line speed is equivalent to 1 ms at 9600-bps playback speed.

19.10 SET COUNTER

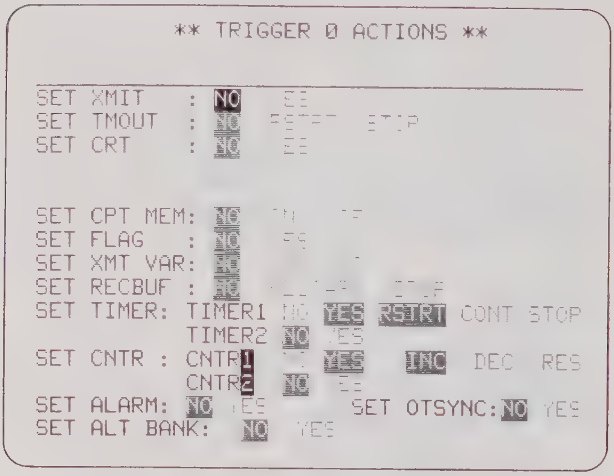
There are eight statistical counters available in the 4600. Each trigger can set any two counters, and several triggers can control the same counter. The default selections are Counters 1 and 2, NO. You may select any of the other counters by writing over the default counter number. When YES is selected, three choices appear (Figure 19-5).

INC. The menu defaults to INCrement because this is the most often used selection. Each trigger occurrence adds 1 (one) to the counter.

DEC. When DECrement is selected, each trigger occurrence subtracts 1 (one) from the counter value.

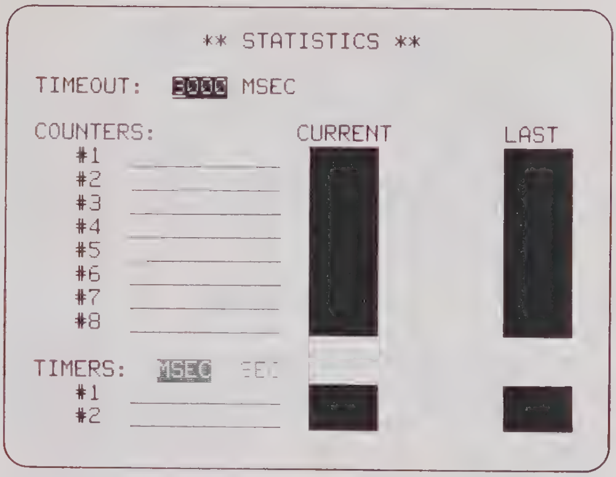
RESET sets the counter to 0 (zero). Whenever a counter is reset by a trigger, the current count is transferred to the LAST column of the Results display.

The maximum count for each counter is 65,535; the minimum is 0. When either limit is passed, OVerFLOw appears on the Results display. Counters can be reset in Run Mode (see Section 8.3). They may be named on the Statistics menu (see Section 19.14).



```
          ** TRIGGER 0 ACTIONS **

SET XMIT    : NO    YES
SET TMOUT   : NO  RSTRT  STOP
SET CRT     : NO    YES


SET CPT MEM: NO    ON    OFF
SET FLAG    : NO    YES
SET XMT VAR: NO  [illegible]
SET RECBUF  : NO  [illegible]  [illegible]
SET TIMER: TIMER1 NO YES RSTRT CONT STOP
           TIMER2 NO YES
SET CNTR  : CNTR1  NO YES    INC  DEC  RES
            CNTR2  NO  YES
SET ALARM: NO YES      SET OTSYNC:NO YES
SET ALT BANK:  NO  YES
```

Figure 19-5



```
          ** STATISTICS **

TIMEOUT:  3000 MSEC

COUNTERS:                CURRENT       LAST
   #1   __________
   #2   __________
   #3   __________
   #4   __________
   #5   __________
   #6   __________
   #7   __________
   #8   __________

TIMERS:  MSEC   SEC
   #1   __________
   #2   __________
```

Figure 19-6

19.11 ALARM

The alarm is a multiple beep each time the trigger comes true. It is useful for calling your attention to the unit, especially when the situation of interest occurs infrequently. For example, the alarm can be set to sound whenever data is frozen on the CRT for analysis.

If you select YES, the alarm is sounded when the trigger comes true.

19.12 SET OUTSYNC

When SET OuTSYNC is selected, the DCE (RD) or DTE (TD) receiver, whichever is selected on the trigger Conditions menu, goes out of synchronization from trigger true until it sees the next synchronization pattern. While the receiver is out of synchronization, no data from that side of the line is presented to the 4600 display or its counters or timers. However, the data is still recorded because the 4600 has separate receivers for the Capture Memory.

This ability is useful when the information after a header group is of no interest, but you need to see data on the other side of the line. In this case, Freeze would not be applicable since it inhibits addition of all data to the display.

19.13 ALTERNATE BANK

As mentioned in Section 17.3, the triggers are grouped into two banks of eight triggers, 0 through 7 (the low bank) and 8 through F (the high bank). When the ALTernate BANK action takes effect, the alternate bank of triggers becomes active and the present bank goes dormant. When the unit enters Run Mode, the low bank (Triggers 0-7) is always active.

When the alternate bank triggers become active, they see everything that is happening at that instant, whether or not the occurrences were initiated by a trigger on the other bank. For example, if a trigger starts a transmission and sets ALT BANK, the alternate bank triggers may see the end of the transmission. Flag status is unchanged by the alternate bank action, so flags are a good means of communication between the two banks.

19.14 STATISTICS MENU

To obtain the Statistics menu, press the red STATISTICS key while the unit is in Program Mode.

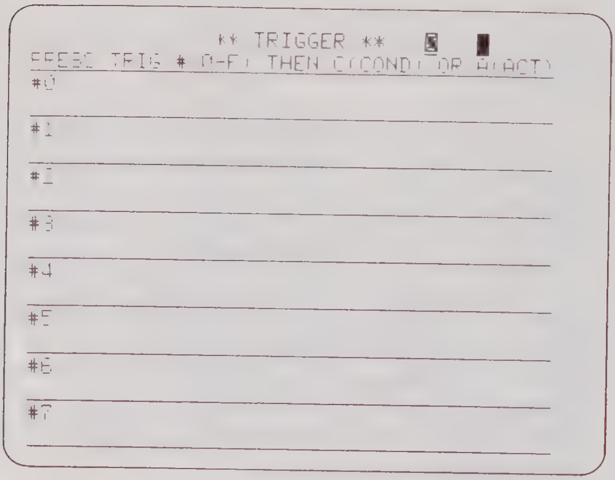
The Statistics display (see Figure 19-6) has three uses:

(1) Enter a value for the timeout timer. The timeout timer increments in milliseconds. The data-entry field defaults to 3000 msec, and you may alter the default entry to any value up to 6800. (See Section 19.3.)

(2) Enter the descriptive names and (or) functions of the eight counters and two timers (see Sections 19.9 and 19.10). Alphanumeric and control characters are both legal in the name entry fields, but hexadecimal is not permitted.

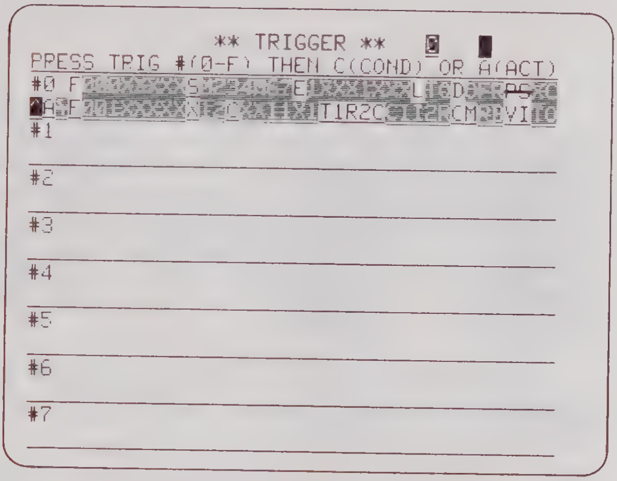
(3) Select the units in which the timers read. Timers may be set to increment in seconds or milliseconds. The default selection is milliseconds.

NOTE: In Run Mode, the RESULTS key obtains this same display, but with real-time counter and timer readings displayed (see Section 8.3).



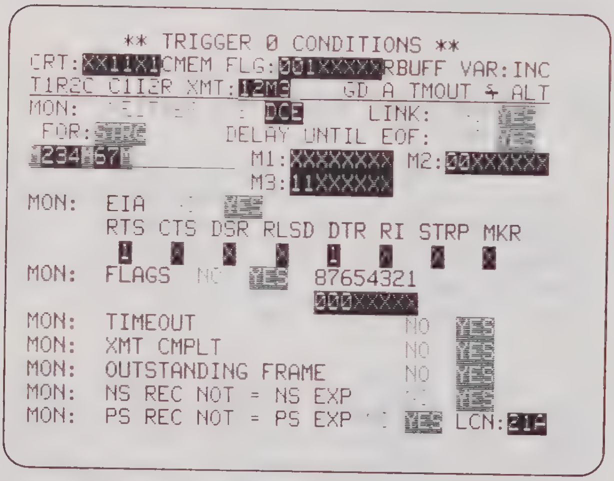
```
          ** TRIGGER **
PRESS TRIG #(0-F) THEN C(COND) OR A(ACT)
#0

#1

#2

#3

#4

#5

#6

#7
```

Figure 20-1 Default Trigger Summary.



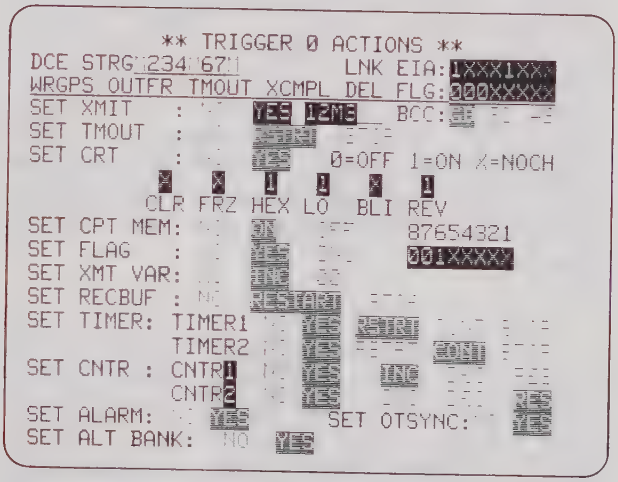
```
          ** TRIGGER **
PRESS TRIG #(0-F) THEN C(COND) OR A(ACT)
#0 F[illegible]S[illegible]E[illegible]U[illegible]D[illegible]PS[illegible]
[illegible]A[illegible]F[illegible]X[illegible]C[illegible]X[illegible]T1R2C[illegible]CM[illegible]VI[illegible]
#1

#2

#3

#4

#5

#6

#7
```

Figure 20-2 Trigger Summary for menus shown in Figures 20-3 and 20-4.



```
      ** TRIGGER 0 CONDITIONS **
CRT:XX11X1CMEM FLG:001XXXXXRBUFF VAR:INC
T1R2C C1I2R XMT:12M3      GD A TMOUT + ALT
MON: [illegible]      DCE      LINK: [illegible]
 FOR:[illegible]        DELAY UNTIL EOF: [illegible]
1234567[illegible]          M1:XXXXXXXX M2:00XXXXXX
                      M3:11XXXXXX
MON:  EIA    [illegible]
      RTS CTS DSR RLSD DTR RI STRP MKR
       1   X   X   X    1   X   X   X
MON:  FLAGS  NO  YES  87654321
                      000XXXXX
MON:  TIMEOUT                    NO  YES
MON:  XMT CMPLT                  NO  YES
MON:  OUTSTANDING FRAME          NO  YES
MON:  NS REC NOT = NS EXP        NO  YES
MON:  PS REC NOT = PS EXP    NO YES LCN:21A
```

Figure 20-3 Trigger Conditions menu showing Actions summary for menu of Figure 20-3.



```
         ** TRIGGER 0 ACTIONS **
DCE STRG1234567          LNK EIA:1XXX1XXX
WRGPS OUTFR TMOUT XCMPL DEL FLG:000XXXXX
SET XMIT    :      YES 12M3   BCC:[illegible]
SET TMOUT   :      [illegible]
SET CRT     :      YES    0=OFF 1=ON X=NOCH
            X   X   1   1   X   1
           CLR FRZ HEX LO  BLI REV
SET CPT MEM:       ON            87654321
SET FLAG   :       YES           001XXXXX
SET XMT VAR:       INC
SET RECBUF : NO    RESTART
SET TIMER: TIMER1     YES [illegible]
           TIMER2     YES           [illegible]
SET CNTR : CNTR1      YES    INC
           CNTR2      YES
SET ALARM:    YES         SET OTSYNC:    YES
SET ALT BANK:  NO   YES
```

Figure 20-4 Trigger Actions menu showing Conditions summary for menu of Figure 20-2.

20
THE TRIGGER MENU SUMMARIES

20.1 TRIGGER SUMMARY

You may obtain a Trigger Summary display at any time by pressing the red TRIGGER key. Usually, you will immediately see the Summary of the low-bank Triggers. However, if you press TRIGGER while a high-bank Trigger menu is displayed, the high-bank Trigger Summary will appear. Figure 20-1 shows the default low-bank Summary.

While the low-bank summary is displayed, you can obtain the high-bank summary by pressing the UP or DOWN cursor arrow; to return the low-bank summary, press the UP or DOWN cursor arrow again.

Figure 20-2 shows the Trigger Summary for the nonsense trigger menus shown in Figures 20-3 and 20-4. The summary for Trigger 0 is identified by #0 at the left; that for Trigger 1 by #1, and so forth. For each trigger, the first line summarizes the Conditions menu and the second line summarizes the Actions menu. Entries appear on the summary only if YES is selected on the menu. The entries on the Summary are not in the same order as they appear on the trigger menu. No Actions will appear on the Trigger Summary unless a Condition has been selected.

The abbreviations used on the Trigger Summary are defined in Tables 20-1 and 20-2.

20.2 ACTIONS SUMMARY

Figures 20-3 and 20-4 are the Conditions and Actions menus for the same trigger. Lines 2 and 3 of the Conditions menu summarize the Actions menu. Table 20-2 defines the abbreviations used on this summary.

20.3 CONDITIONS SUMMARY

Lines 2 and 3 of Figure 20-4 summarize the Conditions menu shown in Figure 20-3. The abbrevia-tions used are defined in Table 20-1.

20.4 PROGRAM SUMMARY

The Trigger Summary described in Section 20.1 can be viewed in Run Mode without affecting the program or test. Simply press the PROGRAM SUMMARY key to see the Summary of the currently active trigger bank; and repeat the Program Summary Key to see the alternate bank summary. The DATA key brings back the data display.

TABLE 20-1
TRIGGER CONDITIONS MNEMONICS

Trigger Menu	Conditions Summary	Trigger Summary
NEITHER	No Entry	No entry
DTE	DTE	No underline
DCE	DCE	Underline
LINK: NO	No entry	No entry
LINK: YES	LNK	L
STRG	STRG ______	S ☐
M (Bit Mask)	M (Low intensity)	M
1 OF	1 OF ______	1 ☐
PARER	PARER	PARER
GDBCC	GDBCC	GDBCC
BDBCC	BDBCC	BDBCC
FRAME	FRM	F
INFO	INFO	INFO
RR	RR	RR
RNR	RNR	RNR
REJ	REJ	REJ
SREJ	SREJ	SREJ
SARM	SARM	SARM
SABM	SABM	SABM
DISC	DISC	DISC
UA	UA	UA
FRMR	FRMR	FRMR
OTHER__	OTHER__	OTHER
ADDR:__	ADDR:__	No entry
P/F:__	No entry	No entry
PACKET	PKT	P
DATA	DATA	DATA
RR	RR	RR
RNR	RNR	RNR
REJECT	REJECT	REJ
INT	INT	INT
INT CNF	INT CNF	INT CNF
DIAG	DIAG	DIAG
OTHER__	OTHR ___	OTHER
RSTRT C	RSTRT C	RSTRT C
RSTRT R	RSTRT R	RSTRT R
RESET C	RESET C	RESET C
RESET I	RESET I	RESET I

(cont.)

TABLE 20-1 (cont.)

Trigger Menu	Conditions Summary	Trigger Summary
CLEAR C	CLEAR C	CLEAR C
CLEAR R	CLEAR R	CLEAR R
CALL AC	CALL AC	CALL AC
CALL RQ	CALL RQ	CALL RQ
LCN:____	LCN:____	No entry
QDM:____	No entry	No entry
ABORT	ABORT	ABORT
DELAY UNTIL EOF: NO	No entry	No entry
DELAY UNTIL EOF: YES	DEL	D
EIA NO	No entry	No entry
EIA YES	EIA: ☐	E ☐
FLAGS NO	No entry	No entry
FLAGS YES	FLG: ☐	F ☐
TIMEOUT NO	No entry	No entry
TIMEOUT YES	TMOUT	TO
OUTSTANDING FRAME NO	No entry	No entry
OUTSTANDING FRAME YES	OUTFR	OFR
NS REC NOT=NS EXP NO	No entry	No entry
NS REC NOT=NS EXP YES	WRGNS	~~NS~~
PS REC NOT=PS EXP NO	No entry	No entry
PS REC NOT=PS EXP YES	WRGPS	~~PS~~
LCN:____	No entry	No entry
XMT CMPLT NO	No entry	No entry
XMT CMPLT YES	XCMPL	XC

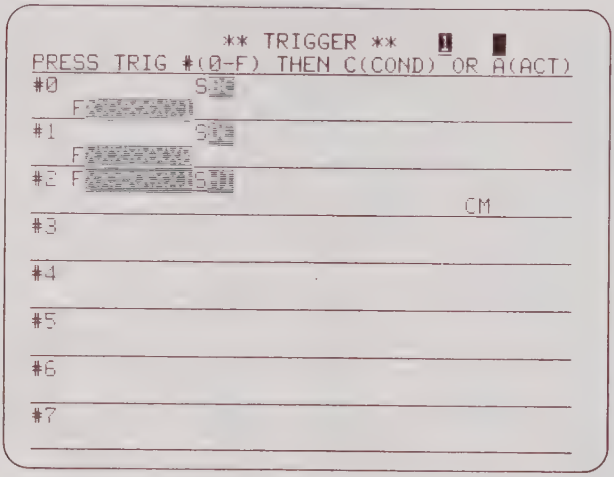
TABLE 20-2
TRIGGER ACTIONS MNEMONICS

Trigger Menu	Actions Summary	Trigger Summary
XMIT: ________	XMT: ☐	X ☐
BCC: GD	GD	No entry
BCC: BD	BD	No entry
BCC: NO	No entry	No entry
BCC: AB	No entry	No entry
TMOUT: NO	No entry	No entry
TMOUT: RSTRT	TMOUT	TO
TMOUT: STOP	~~TMOUT~~	~~TO~~
CRT: NO	No entry	No entry
CRT: YES	CRT: ☐	C ☐
CPT MEM: NO	No entry	No entry
CPT MEM: ON	CMEM	CM
CPT MEM: OFF	~~CMEM~~	~~CM~~
FLAG: NO	No entry	No entry
FLAG: YES	FLG: ☐	F ☐
FLAG: INC	FLG: INC	F INC
XMT VAR: NO	No entry	No entry
XMT VAR: INC	VAR: INC	VI
XMT VAR: __	VAR:__	VS
RECBUF: NO	No entry	No entry
RECBUF: RESTART	RBUF	RB
RECBUF: STOP	~~RBUF~~	~~RB~~
TIMER_: NO	No entry	No entry
TIMER_: YES	T__	T__
RSTRT	R	R
CONT	C	C
STOP	S	S

(cont.)

TABLE 20-2 (cont.)

Trigger Menu	Actions Summary	Trigger Summary
CNTR_: NO	No entry	No entry
CNTR_: YES	C __	C__
INC	I	I
DEC	D	D
RES	R	R
ALARM: NO	No entry	No entry
ALARM: YES	A	A
OTSYNC: NO	No entry	No entry
OTSYNC: YES	~~SY~~	~~SY~~
ALT BANK: NO		
ALT BANK: YES	No entry	No entry
	ALT	Λ



```
               ** TRIGGER **    ▮   ▮
PRESS TRIG #(0-F) THEN C(COND) OR A(ACT)
#0          S
   F
#1          S
   F
#2 F        S
                                 CM
#3

#4

#5

#6

#7

```

Figure 21-1

21
TRIGGER TIMING AND SEQUENCE

Although all triggers are simultaneously active, there is an order in which they are processed. The order of trigger processing is significant only in special situations (as in Section 21.2).

21.1 ORDER OF PROCESSING

Basically, all triggers are first evaluated in order (0 through 7 or 8 through F) for their conditions to be true; then the trigger actions are taken in order (0 through 7 or 8 through F). This process permits the same internal flag to be sensed and set by the same trigger.

The sequence that occurs after each character is received is as follows:

(1) Evaluate triggers that do not look for data.

(2) Evaluate triggers that look for DTE data.

(3) Evaluate triggers that look for DCE data.

(4) Set all actions applicable for each trigger in order (0 through 7 or 8 through F).

21.2 EXAMPLES

Usually the timing described in Section 21.1 is not important. However, under certain circumstances, such as when internal flags are being set and tested, these timing relationships are significant.

Consider the case in which a string on the DTE line sets a flag; another DTE string resets the flag; and that flag in conjunction with a DCE string turns on the tape. Figure 21-1 shows the Trigger Summary for this example. Trigger 0 looks for a string, BC, on the DTE side of the line and turns Flag 1 ON when the string is found. Trigger 1 looks for a string, DE, on the DTE side and turns Flag 1 OFF when the string is found. Trigger 2 looks for Flag 1 to be ON in conjunction with a DCE string of HI and turns ON the tape when this condition is met.

Suppose that the following data is received and shown in dual-line display on the CRT:

```
DTE -- A B C D E F
DCE -- G H I J K L
```

Before we consider what the program of

Figure 21-1 will do with this data, we must understand how this data may have been received. First, the time correla tion between the DTE and DCE lines on the display is accurate to ±1 character. Second, the display has a resolution, at the very best, of only one character. Thus, the two lines may actually be skewed by half a character or even one bit, but this cannot be shown on the display. Third, the program processes characters within microseconds after they are received. Thus, two characters that appear on the screen to have been received simultaneously may not have been treated that way by the program.

Our sample program is looking for a string of BC on the DTE line and HI on the DCE line. On the display, these characters appear to have been received simultaneously, but actually string BC may have been received (1) before, (2) after, or (3) simultaneously with string HI. We now consider what action would be taken in each of the three cases.

(1) BC String Received before HI String: The Trigger 0 conditions and actions are processed before the Trigger 2 conditions and actions. Thus, when BC is received, Flag 1 is turned ON. When HI is received Flag 1 is already ON and the Trigger 2 conditions are met, so the tape is turned ON.

(2) BC String Received after HI String: Trigger 0 conditions and actions are processed after the Trigger 2 conditions and actions. Thus, when the HI string is received, Flag 1 has not yet been turned ON and the Trigger 2 conditions are not met, so the tape is not turned ON.

(3) BC and HI Strings Received Simultaneously: For this case, we must consider the trigger timing discussed in Section 21.1. Remember that all trigger conditions are tested before any of the actions are taken. First, the string BC on the DTE line is checked and found to be true, but no action is taken yet. Next, the string HI on the DCE line is evaluated, but since the Trigger 1 action has not yet been taken, Flag 1 has not been turned ON and the Trigger 2 conditions are not met.

Now that all of the conditions have been evaluated, the actions will be taken. The Trigger 0 condition having been met, the Trigger 0 action is taken first, so Flag 1 is now turned ON. Because the Trigger 2 condition has not been met, the Trigger 2 action is not taken, so the tape is not turned ON. In this case, even though Flag 1 has been turned ON, the tape is not, because the flag was not turned ON until after the Trigger 2 condition was tested.

Thus we see that for the same CRT display two different actions may be taken by the program. This is due to the resolution limitations of the CRT. The program is executing within microseconds of receiving each character and with much better resolution than is possible on the CRT.

22. THE CAPTURE MEMORY: GENERAL INFORMATION

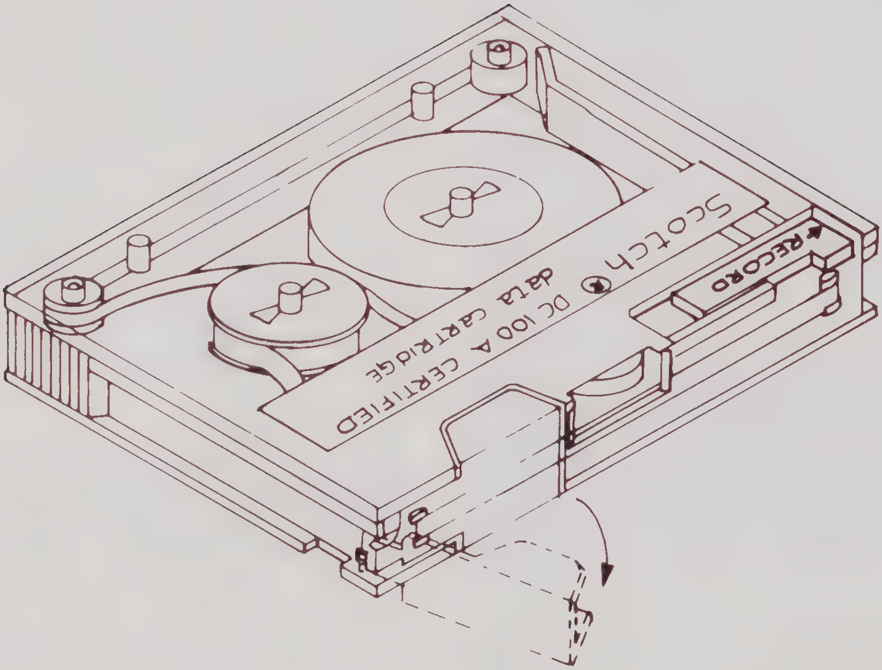


Figure 22-1

22

THE CAPTURE MEMORY: GENERAL INFORMATION

The INTERVIEW 4600's Capture Memory comprises an integral tape and an optional high-speed Random Access Memory (RAM). You can record data either on the tape or in RAM, and monitor and analyze data as it is played back. Tape and RAM can be controlled automatically or manually, or by triggers. The data content of the RAM can be transferred to tape or vice versa (Section 24).

On the tape, you can save a 4600 program along with the data. You can also record multiple-program tapes containing up to 100 programs. For program recording, see Section 25.

Both program-data and multiple-program tapes can be duplicated (see Section 26).

22.1 THE TAPE DRIVE

(a) Tape Installation. The INTERVIEW should be in Program Mode when the tape is installed so that the logic can recognize that a new tape has been inserted.

Figure 22-1 shows the 4600's tape cartridge. The tab on the drive edge of the cartridge is used to write-protect a recorded tape. When the tab is pushed toward the center of the cartridge, the tape cannot be recorded. If you attempt to record on a write-protected tape, the 4600 will display the message TAPE IS WRITE-PROTECTED. To record, position the tab toward the outer edge of the cartridge.

Insert the tape cartridge in the drive at the right of the front panel with the drive wheel to the rear and the transparent window on top. Push it gently in until you feel it lock.

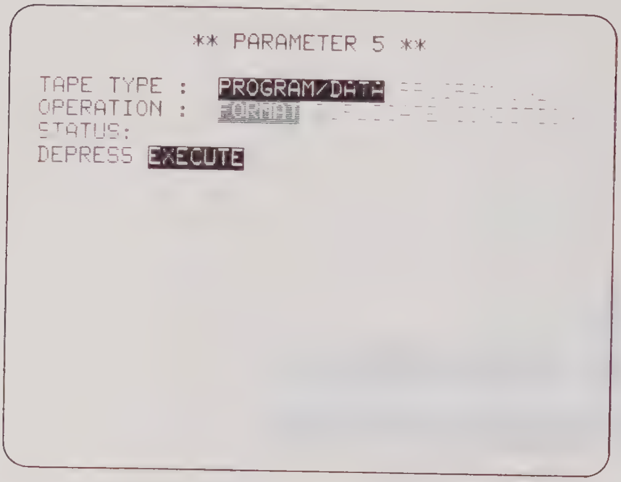
CAUTION: Always press the PROGRAM (or MANUAL STOP) key to stop tape motion before you remove the tape.

(b) Tape Removal. To remove the tape, press PROGRAM to stop tape motion; then the EJECT button under the tape drive. Pull the tape cartridge out. Removing the tape will not alter the program in the unit.

(c) Tape Drive Maintenance. The tape drive should be serviced regularly. Please follow the instructions in Appendix J.7.

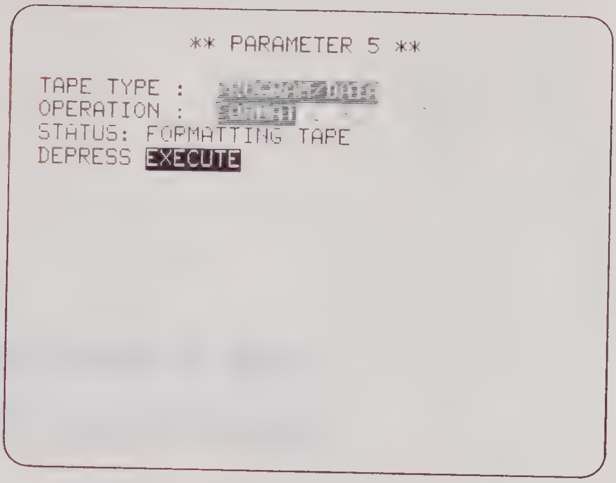
22.2 TAPE FORMAT

There are 250 to 260 blocks on a tape. One block contains 2400 charac-



```
** PARAMETER 5 **
TAPE TYPE :  PROGRAM/DATA
OPERATION :  FORMAT
STATUS:
DEPRESS EXECUTE
```

Figure 22-2



```
** PARAMETER 5 **
TAPE TYPE :  PROGRAM/DATA
OPERATION :  FORMAT
STATUS: FORMATTING TAPE
DEPRESS EXECUTE
```

Figure 22-3

TABLE 22-1

INTERVIEW 4600 HIGH-SPEED MEMORY OPTIONS

Option		Bytes		Blocks	
Name	Number	Decimal	Hex	Numbers	Partial block
1-Megabit RAM	05-2	131072	128k	0 - 54	54 (1472 bytes)
4-Megabit RAM	05-3	524288	512k	0 - 218	218 (1088 bytes)

ters (1200 from each side of the line) when interface status is not recorded. If interface status is recorded on tape, each block will contain 1600 characters (800 from each side of the line) plus 800 interface samples.

22.3 TAPE SPEED

The maximum recording speeds for the tape are (a) 19.2 kbps if interface lead status is not being recorded and (b) 9.6 kbps if interface lead status is being recorded. Maximum tape playback speed is 9.6 kbps.

22.4 HIGH-SPEED MEMORY OPTION (RAM)

The 4600's optional High-Speed Memory (RAM) will record data at speeds up to 72 kbps. The maximum usable playback speed from RAM is 28.8 kbps. The RAM does not record programs.

When the RAM option is installed, it will be announced on the power-up display as OPTIONS: 05 after the automatic power-up tests are in progress. There are two RAM sizes, as specified in Table 22-1, but the power-up display does not identify which is installed in the unit. If OPTIONS: 05 is displayed, observe the duration of the self tests. With the 1-Megabit RAM, the self tests will take no more than 10 seconds; with the 4-Megabit RAM, the tests will take close to 30 seconds.

A Series 70 error code displayed on power-up indicates a RAM problem, which may in turn affect other boards. See Appendix K.3 for an explanation of RAM errors and instructions for conducting further self tests of the RAM.

The RAM is a volatile memory, with no power backup. For permanent storage the RAM content must be transferred to tape (see Section 24) or printed (see Section 27) before the 4600 is turned off.

Table 22-1 presents data on the capacity of the two RAM options. The RAM block size is 2400 bytes, just as for the tape. It does not record interface status. The last block of memory is a partial block, as shown in Table 22-1.

22.5 FORMATTING TAPES

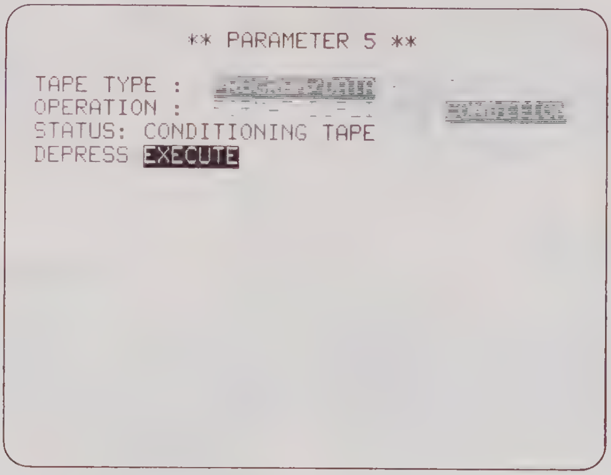
For operation in the INTERVIEW 4600, all new tapes must first be formatted either as program-data tapes (approximately 255 blocks) or as program-only tapes (100 program records; see Section 25.4). All formatting can be done automatically.

CAUTION: If there is data on the tape, formatting will erase it.

Press PARAMETERS and numeral 5 to display the Tape Utility menu (see Figure 22-2). Install the blank tape -- or a tape to be reformatted -- in the drive with the tab in the RECORD position (toward the outside of the cartridge). Select the TAPE TYPE: PROGRAM/DATA if you want to use the tape for data; PROGRAM ONLY if you want to make a Multiple-Program tape. Select FORMAT, which is the default OPERATION selection, and press the yellow EXECUTE key.

If the tab on the tape is in the PROTECTED position the tape cannot be formatted, and the status line will display the message TAPE IS WRITE PROTECTED. If the tape is not protected, the message FORMATTING TAPE (Figure 22-3) will blink on the Status line. When formatting is completed, after about 2 1/2 minutes, the STATUS will change to TAPE FORMATTED.

The INTERVIEW 4600 can now always identify the tape as a program-data or multiple-program tape and can find any data block or program record on it.



```
** PARAMETER 5 **

TAPE TYPE :  [illegible]
OPERATION :                   [illegible]
STATUS: CONDITIONING TAPE
DEPRESS EXECUTE
```

Figure 22-4

Multiple-program tapes are formatted with the lowest-numbered records at the beginning and the highest-numbered records at the end. All odd-numbered records will be on one track, and all even-numbered records on the other track. Program-data tapes are formatted with the block number sequence going up one track and back the other, so that the lowest and highest numbers are at the beginning of the tape.

22.6 RETENSIONING TAPES

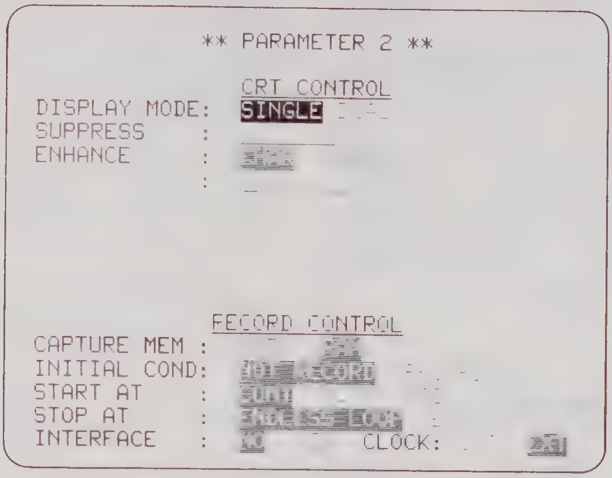
If a recorded tape has not been kept in a controlled environment, it may have been subject to temperature changes or vibration. To avoid faulty operation, especially if the tape is to be used for analysis, it should be retensioned before use.

You may retension any tape without affecting its content by selecting CONDITION on the Parameters 5 menu. Insert the tape with the tab in the PROTECTED position and press the EXECUTE key. The Status line will display CONDITIONING TAPE (Figure 22-4) while the tape is being retensioned; then TAPE CONDITIONED when it is finished.

Each time you use the Parameters 5 menu to format or duplicate a tape, the tape is automatically retensioned.

22.7 DUPLICATING TAPES

Program-data and multiple-program tapes both can be duplicated automatically, using the DUPLICATE selection on the Parameters 5 menu. The procedure for this is given in Section 26.



```
               ** PARAMETER 2 **

                 CRT CONTROL
DISPLAY MODE:    SINGLE [illegible]
SUPPRESS    :    [illegible]
ENHANCE     :    [illegible]
            :    [illegible]




               RECORD CONTROL
CAPTURE MEM :    [illegible]
INITIAL COND:    [illegible]
START AT    :    [illegible]
STOP AT     :    [illegible]
INTERFACE   :    [illegible]       CLOCK:    [illegible]
```

Figure 23-1

23
DATA RECORDING AND PLAYBACK

23.1 RECORDING: PARAMETERS 1 MENU SELECTIONS

When LINE has been selected for the data source on the Parameters 1 menu, both received and transmitted data may be recorded on the tape. The only other Parameters 1 menu requirement to enable recording is to enter the correct SPEED if INTernal CLOCK is selected on the Parameters 2 (Record Control) menu.

23.2 AUTOMATIC RECORDING: THE RECORD CONTROL MENU

The Record Control menu is on the same display, Parameters 2, as the CRT Control menu.

> NOTE: When TAPE or RAM is selected as data SOURCE on the Parameters 1 menu, the Record Control menu goes away.

(a) Capture Memory. This field (see Figure 23-1) is present only if a high-speed memory (RAM) option has been installed in the INTERVIEW. If TAPE is selected, all fields on the Record Control menu apply to the 4600's integral tape; if RAM, they apply to the high-speed memory. Block size of both tape and RAM is the same. (See Section 22 for explanation of tape and RAM block numbering.)

> NOTE: All tapes should be formatted before use.

(b) Initial Condition. Data recording may be initiated and stopped automatically when the INTERVIEW enters and leaves Run Mode by selecting INITIAL COND: RECORD. This field is entitled INITIAL CONDition because, whether NOT RECORD or RECORD is selected, this condition may be altered by the Set Capture Memory selection on a trigger menu.

(c) Start At. START AT selections are analogous to those for playback on the Parameters 1 menu (see Section 12.4).

Whether recording begins under trigger or manual control, if CONTinue is selected recording will begin after the last block previously recorded.

When BLOCK=000 is selected, recording begins at the first block, whether or not this entails writing over previously recorded data. You may also choose to start recording at any other specified block by entering the block number (decimal) over the 000. Thus you may avoid writing over old data altogether, or you may choose to write over any number of blocks of old data.

(d) Stop At. STOP AT offers the choice between beginning again at Block 000 when the tape, or RAM, is full, thus writing over previously recorded data (ENDLESS LOOP), or stopping at the last block (END).

(e) Interface. This selection is only valid for tape; the RAM will not record interface status. When INTERFACE:YES is selected, the status of six RS-232/V.24 leads (RTS, CTS, DSR, RLSD, DTR, RI), the user-assigned lead -- if it has been strapped to an interface lead (see Appendix J.5) -- and the ENTER key (marker; see Section 18.7) is automatically recorded. While the recorded data is being played back, the status of the recorded leads is shown on the EIA Status indicator panel.

(f) Clock. Both tape and RAM will run off either internal or external clock. CLOCK on this menu applies only to the separate Capture Memory receivers and is completely independent of the Clock selection on the Parameters 1 menu, which is for the logic-CRT receivers.

EXTernal clocking may be used when clock is being supplied on the interface. Selecting EXTernal clock then permits recording whether or not data is displayed on the CRT, and whether the data is synchronous or isochronous (ASYNC with external clock).

> NOTE: The 4600 will not record off external clock if clock is not being received from both DTE and DCE. This could occur, for instance, when a modem is set for New Sync. In this case, INTernal CLOCK and the correct data speed must be selected.

When clock is not supplied via the RS-232 interface, INT CLOCK must be selected. In this case, be sure to enter the correct data SPEED on the Parameters 1 menu.

Maximum speed for recording on tape is 19.2 kbps (9.6 kbps if interface leads are being recorded). The RAM can record at up to 72 kbps, but external clock must be used above 19.2 kbps.

23.3 MANUAL RECORDING: THE CAPTURE MEMORY KEYS

The three green Capture Memory keys control recording (and playback) of either tape or RAM, depending on which has been selected on the Record Control (or Parameters 1) menu. You can start or stop recording (or data playback) manually using the MANUAL START and MANUAL STOP keys whether or not triggers have been set to control recording. The only way to return the Capture Memory to trigger control, however, is to operate the RESUME TRIGGER key.

To manually record line data into the Capture Memory select Tape or RAM on the Record Control menu (if the RAM option is installed). Then, only two keys are required.

(1) To record on tape, remember to position the tab on the tape to RECORD position (toward the outside edge of the cartridge), before you install it.

(2) Press RUN; then operate the MANUAL START key in the CAPTURE MEMORY zone of the keyboard.

(3) The RECORD and MANUAL indicators on the status panel will go on and the block number on the first line of the display will increment as each block is recorded.

(4) To stop recording, press MANUAL STOP.

23.4 TRIGGER CONTROL OF RECORDING

Recording may be started and stopped under trigger control. Check the Record Control selections on the Parameters 2 menu, as the trigger actions will be superimposed on these basic instructions.

On the Trigger Actions menus, select CPT MEM:ON or OFF.

In Run Mode, the TRIGGER indicator in the CAPTURE MEMORY zone of the front panel will be ON. The RECORD indicator will flash ON and OFF to indicate the actual status of the recording process as the triggers control it.

23.5 RUN MODE

(a) Status Indicators. The Capture Memory status indicators on the INTERVIEW front panel indicate the status of the tape or RAM, whichever has been selected on the Parameters 2 Record Control menu. While the data is being recorded the RECORD LED is always on. Either the MANUAL or the TRIGGER LED will also be on, to show how the recording process is being controlled.

(b) Recording. During recording, the Capture Memory block number on Line 1 of the display increments for each block received.

Data will be recorded no matter what the data transmission format and whether or not it is being displayed on the CRT, since the 4600 has separate data receivers for the Capture Memory. (See Figure 2-1.)

When the tape or RAM is turned on, the preceding 128 bits (16 bytes in synchronous modes) are automatically recorded too. When it is turned OFF, the following 128 bits are automatically recorded. Therefore, when the Capture Memory is turned off and then on within less than 32 x 8 bits, the data is recorded without interruption. (See Figure 23-2.)

If the PROGRAM key is operated while the tape is recording data, the tape controller automatically records at least one full block of nulls (00, hex).

(c) Manual Override. Control by the Parameters 2 menu or triggers may be overridden by the MANUAL START or MANUAL STOP key. The MANUAL status LED in the CAPTURE MEMORY zone of the front panel will go ON. To return the tape or RAM to trigger control, press RESUME TRIGGER (CAPTURE MEMORY group). The MANUAL LED will go OFF and the TRIGGER indicator will go ON.

23.6 PLAYBACK FROM CAPTURE MEMORY

(a) Enabling Playback. To play back data from tape or RAM, select TAPE or RAM for SOURCE on the Parameters 1 menu. The START AT field that appears on the next line controls the block at which playback will begin. If you select BLOCK 000, playback will begin at Block 000; you can select any other block by writing over the 000. If you select CONTinue, playback will resume from the current block number. The Parameters 1 CLOCK selection will go away, but the SPEED field remains and should be filled in. The maximum speed for tape playback is 9.6 kbps; for RAM, it is 72 kbps.

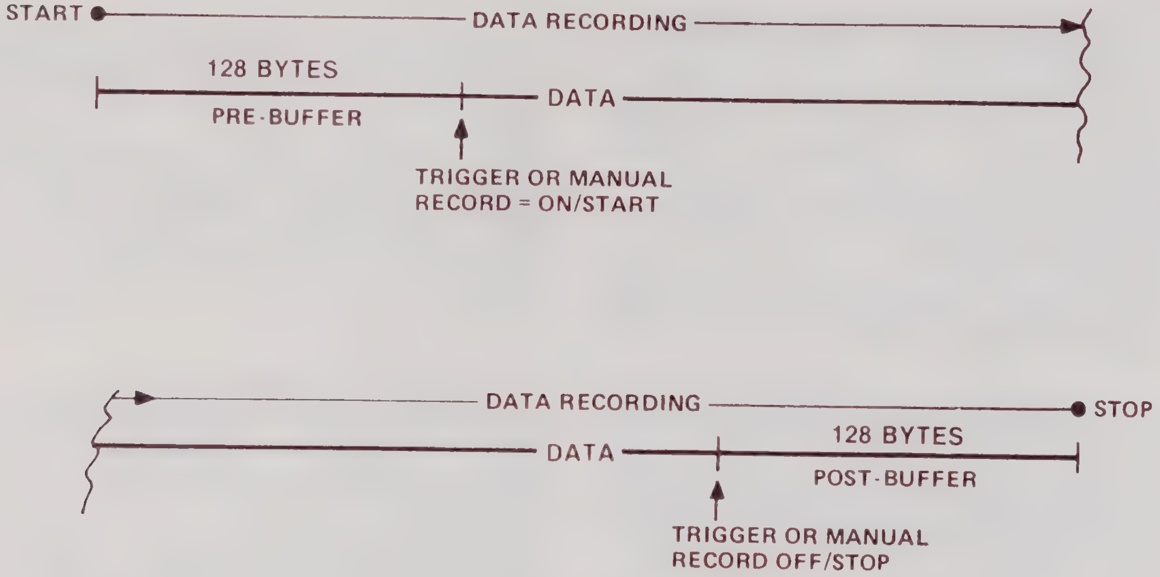

START
DATA RECORDING
128 BYTES
PRE-BUFFER
DATA
TRIGGER OR MANUAL
RECORD = ON/START
DATA RECORDING
STOP
DATA
128 BYTES
POST-BUFFER
TRIGGER OR MANUAL
RECORD OFF/STOP

Figure 23-2

When the data source is the Capture Memory, TAPE or RAM is displayed on the first line followed by the block number, which will increment during playback just as during recording.

(b) Trigger Control. Playback may be controlled by triggers using the SET CPT MEM action just as for recording. The CAPTURE MEMORY keys will also control playback. When playback is stopped with the MANUAL STOP key, tape motion stops and the block number on Line 1 of the CRT display stops incrementing. The MANUAL FREEZE and HALT keys also stop tape motion.

(c) Emulate Modes. Taped or RAM data may be played back in either EMULATE mode. The INTERVIEW will display and monitor either TD or RD recorded data but not both.

For example, assume that you are using a tape with TD and RD data. If you select EM DCE, SOURCE:TAPE, and MON:BOTH, then in Run Mode, the status line will identify the mode as EM DCE, the source as TAPE, and the line monitored as BOTH. You will not see any RD data from the tape. You will see the TD data from the tape and if you transmit during playback the INTERVIEW's transmissions will appear as RD data. Since you can use the taped TD data to trigger on, this is an excellent tool for developing protocol programs or for protocol training.

(d) Altering Playback Speed. During playback from tape or RAM, the data display may be speeded up or slowed. Each operation of the UP cursor arrow doubles the playback speed to a maximum of 9.6 kbps. Each operation of the DOWN cursor arrow halves the playback speed.

NOTE: Remember that manually altering playback speed may invalidate the timer readings.

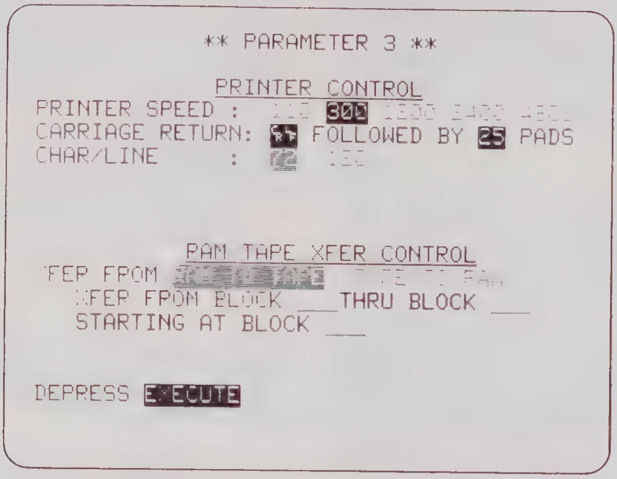
(e) RAM Playback. To play back data from RAM, select SOURCE: RAM on the Parameters 1 menu and enter any speed up to 72 kbps.

During playback from RAM, you may "back up" to the preceding block by pressing the LEFT cursor arrow. There is about a 1-second delay before playback resumes from the previous block. If during this delay you press the LEFT cursor arrow several times in rapid succession, the playback will back up by that number of blocks. If you back up from the beginning of memory, the playback will "wrap around" to the end of memory. Until playback actually resumes, FF (hex) will be sent to the CRT buffer.

Another advantage to the 1-second delay is that it gives you time to clear the CRT with the CLEAR CRT key before the playback resumes.

23.7 ERROR MESSAGES

The 4600 can display a number of error messages concerning tape and RAM operation. These messages and their probable causes are included in Appendix D.



```
                 ** PARAMETER 3 **

                  PRINTER CONTROL
PRINTER SPEED :  110 300 1200 2400 4800
CARRIAGE RETURN: CR FOLLOWED BY 25 PADS
CHAR/LINE      : [illegible]  132



               RAM TAPE XFER CONTROL
 XFER FROM [illegible]  TAPE TO RAM
   XFER FROM BLOCK ___THRU BLOCK ___
   STARTING AT BLOCK ___


DEPRESS EXECUTE
```

Figure 24-1

24
RAM-TAPE DATA TRANSFER

If a High-Speed Memory option (RAM) is installed in the INTERVIEW, you may transfer part or all of the content of RAM to the tape, or vice versa, using the RAM-Tape Xfer Control menu on the Parameters 3 screen (Figure 24-1). This menu will not appear unless RAM is present. Recorded programs cannot be transferred, since the RAM does not store programs.

The block lengths and numbering of tape and RAM correspond, but notice (see Table 22-1) that there are fewer blocks in RAM than on the tape and also the last block of RAM is a partial block.

(1) If you wish to transfer data to the tape, remember to position the tab on the cartridge to the RECORD position.

> *CAUTION: The transfer logic does not check tape type and it will record over any program-data or multiple-program tape.*

(2) Display the Parameters 3 menu.

(3) Select the direction of transfer, RAM TO TAPE or TAPE TO RAM. The default direction is RAM TO TAPE.

(4) Enter the block number from which you wish transfer to begin (XFER FROM BLOCK ___) and then the block number at which you wish it to stop.

> NOTE: All block numbers must be entered as three-digit numbers.

(5) Enter the block number at which you wish recording to begin (STARTING AT BLOCK ___).

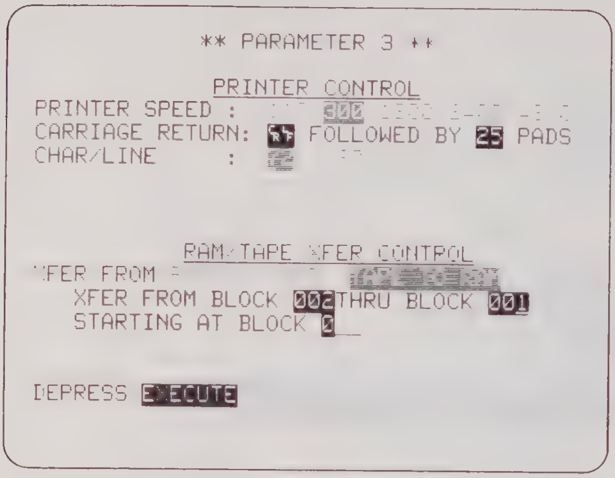
(6) To execute these instructions, press the yellow EXECUTE key while the Parameters 3 menu is still displayed. The tape will move to the selected block before transfer begins.

If the RAM has been told to go to a block number beyond the end of memory, the following message will appear:

```
MEMORY BLOCK NOT FOUND MAX BLK #  XXX
```

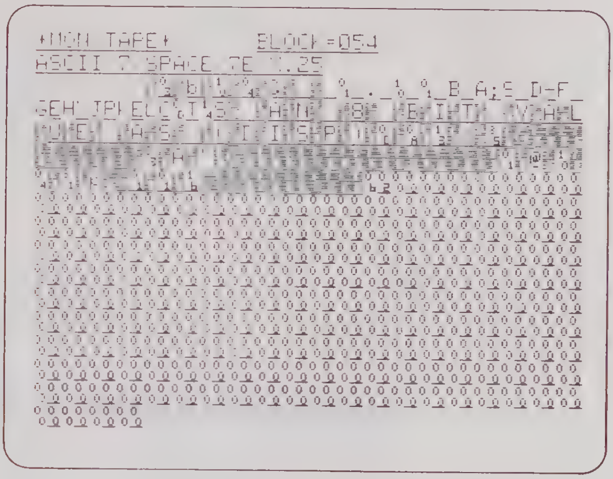
This can occur in Ram-to-Tape transfer if the "XFER FROM" block number is too large, or in Tape-to-RAM transfer if the "STARTING AT" block is too large.

You can verify that the transfer is in progress by watching the number of blocks increment on Line 2 in the message XFER IN PROCESS: XXX BLOCKS TRANSFERRED. The time required for transfer is determined by the time it takes the tape to reposition itself and record or play back the data.



```
              ** PARAMETER 3 **

               PRINTER CONTROL
PRINTER SPEED :      300
CARRIAGE RETURN: RF FOLLOWED BY 25 PADS
CHAR/LINE      :


            RAM/TAPE XFER CONTROL
XFER FROM
   XFER FROM BLOCK 002THRU BLOCK 001
   STARTING AT BLOCK 0__

DEPRESS EXECUTE
```

Figure 24-2



```
*MON TAPE*        BLOCK=054
ASCII 7 SPACE TE 1.25
```

Figure 24-3

Transfer is followed by one of three messages on Line 2:

XFER COMPLETE: XXX BLOCKS TRANSFERRED
END OF MEMORY: XXX BLOCKS TRANSFERRED
TAPE STOPPED @ END: XXX BLOCKS TRANSFERRED

If interface lead status has been recorded on the tape, the status information will be stripped out during the tape-to-RAM transfer. Thus the data in one block of tape containing interface samples will occupy only about two-thirds of a block of RAM.

NOTE: If the data in RAM has been transferred from a tape containing interface samples, any resulting partial block in RAM will be filled out with nulls.

The transfer will not proceed beyond the last block of the destination, whether tape or RAM. If end of tape is found before the transfer is complete, the 4600 will display the message TAPE STOPPED @ END.

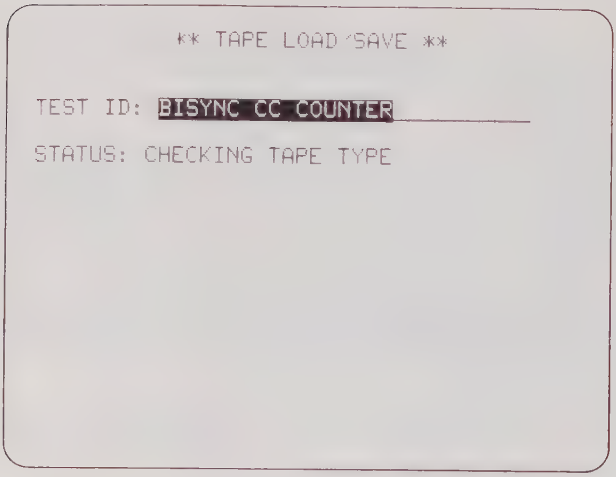
You may transfer from any block of RAM to any preceding block. The transfer will proceed to the end of the memory and then wrap around to Block 000. If, for instance, you transfer Blocks 002 through 001 of the 1-Megabit RAM (see Figure 24-2) to tape, the tape will record 54 full blocks of data and the 55th block will be padded out to a full block with nulls (see Figure 24-3) because the 55th block of 1-Megabit RAM (Block 054) is a partial block.

A transfer from the tape to RAM will wrap around also.

If you do not enter block numbers on the Parameters 3 menu, the 4600 will display an error message.

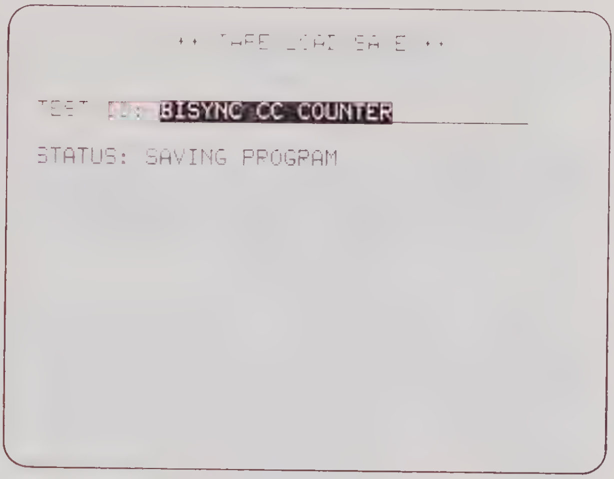
If you transfer any portion of RAM that has not been recorded, "garbage" characters may appear on the tape (for example, nulls, self test data, or old data).

The 4600 can display a number of error messages concerning tape and RAM operation. These messages and their probable causes are included in Appendix D.



```
              ** TAPE LOAD/SAVE **

TEST ID: BISYNC CC COUNTER

STATUS: CHECKING TAPE TYPE
```

Figure 25-1



```
              ** TAPE LOAD/SAVE **

TEST ID: BISYNC CC COUNTER

STATUS: SAVING PROGRAM
```

Figure 25-2

25

CAPTURE MEMORY: SAVING AND LOADING PROGRAMS

Tapes must be formatted before they are used in the 4600. They may be prepared in one of two formats: program-data or multiple-program. A program-data tape can save one complete program as well as data; a multiple-program (program-only) tape can store up to 100 programs. The optional High-Speed Memory does not record programs. Formatting instructions are given in Section 22.5.

25.1 SAVING A PROGRAM ON A PROGRAM-DATA TAPE

CAUTION: If you wish to verify that a program on a tape is no longer of interest, it must be checked before the program to be saved is developed in the 4600. This avoids writing over the new program with the taped program.

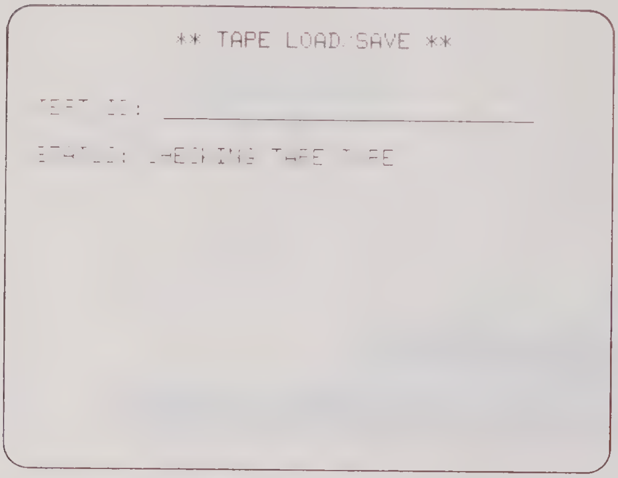
(a) Checking the Tape. To ascertain that the program on a tape is no longer of interest, insert the tape with the tab in the protected position. Press the PROGRAM and LOAD PROG keys: the Tape Load/Save menu will be displayed. When the tape has been searched, the name of any resident program will be shown on the Test ID line. If no program is read, NO PROGRAM/DIRECTORY FOUND or PROGRAM VERSION NOT SUPPORTED will be displayed.

Remove the tape cartridge and develop the desired program in the 4600.

(b) Saving the Program. Develop the program that you wish to save in the INTERVIEW; then use the following procedure to save it.

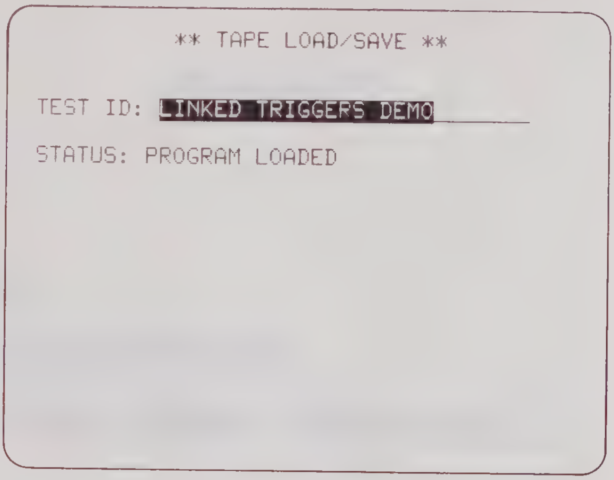
(1) Position the tab on a formatted program-data tape cartridge to RECORD (toward the outside of the case) and insert it in the 4600.

(2) Press the SAVE PROG key. The 4600 will display the Tape Load/Save menu (Figure 25-1). If a Test ID for the program has been entered on the Parameters 1 menu, it will be displayed in the Test ID field of the Load/Save menu. On the Status line the message CHECKING TAPE TYPE will be displayed. If the tape has not been formatted, the INTERVIEW will not proceed. When the



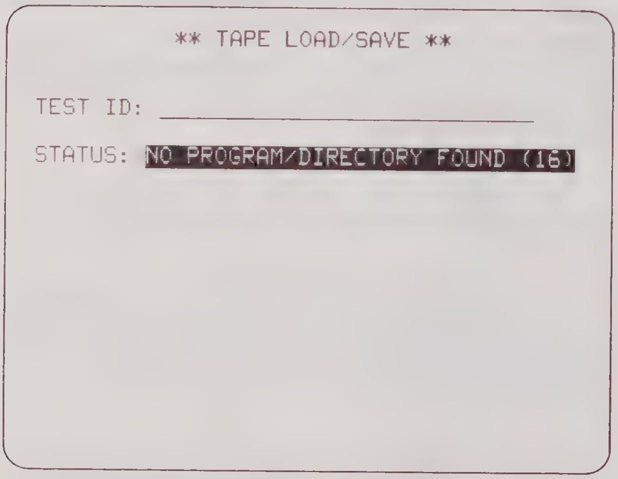
```
** TAPE LOAD/SAVE **

TEST ID: ________________________________

STATUS: CHECKING TAPE TYPE
```

Figure 25-3



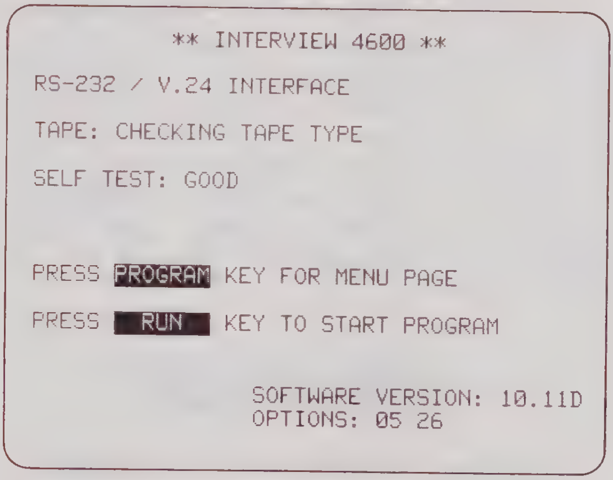
```
** TAPE LOAD/SAVE **

TEST ID: LINKED TRIGGERS DEMO__________

STATUS: PROGRAM LOADED
```

Figure 25-4



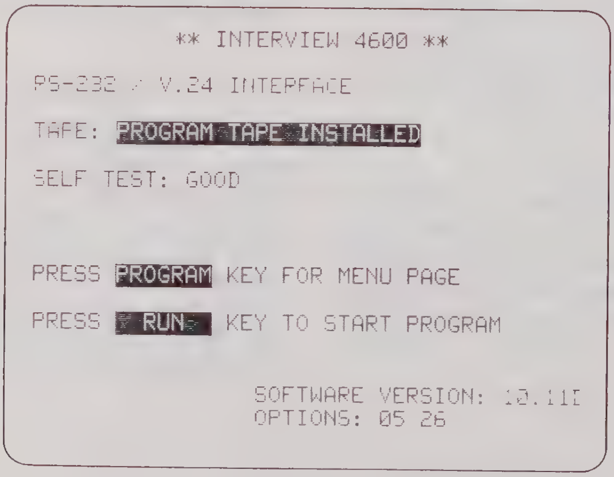
```
** TAPE LOAD/SAVE **

TEST ID: ________________________________

STATUS: NO PROGRAM/DIRECTORY FOUND (16)
```

Figure 25-5



```
** INTERVIEW 4600 **

RS-232 / V.24 INTERFACE

TAPE: CHECKING TAPE TYPE

SELF TEST: GOOD


PRESS PROGRAM KEY FOR MENU PAGE

PRESS   RUN   KEY TO START PROGRAM


                   SOFTWARE VERSION: 10.11D
                   OPTIONS: 05 26
```

Figure 25-6



```
** INTERVIEW 4600 **

RS-232 / V.24 INTERFACE

TAPE: PROGRAM TAPE INSTALLED

SELF TEST: GOOD


PRESS PROGRAM KEY FOR MENU PAGE

PRESS   RUN   KEY TO START PROGRAM


                   SOFTWARE VERSION: 10.11D
                   OPTIONS: 05 26
```

Figure 25-7

tape type has been found, the messages SAVING PROGRAM, VERIFYING PROGRAM, and then PROGRAM SAVED will be displayed successively (Figure 25-2).

(c) Verifying the Saved Program. Verify that the program has indeed been transferred to the tape as follows: (1) Operate the LOAD PROG key. The Tape Load/Save menu should show the Test ID.

(2) Verify the Parameters 1 and Parameters 2 menus, the Trigger and Message menus, and the Statistics display.

(d) Labeling the Tape. Remove the tape and position the tab toward the center of the case to protect the contents. Fill out a label with the program title and parameters. Prefold the label on the perforated line before peeling it off the backing; then attach it to the cartridge.

(e) Bypassing the Tape Type Check. You may save the program in the unit on tape without checking tape type by pressing the CONTROL and SAVE PROG keys simultaneously. The 4600 will assume that a program-data tape is installed and save the program without checking for tape type. The program will be saved in the program area according to the program-data format.

This procedure is intended to be used for a program-data tape on which a Program Write Error has occurred during a program Save. Since the 4600 will not write over an unrecognizable tape type, and an incorrectly written program is unrecognizable, CONTROL-SAVE PROG must be used if the tape data is to be retained (it would be lost if the tape were reformatted).

CAUTION: If CONTROL-SAVE PROG is used with a multiple-program tape, the directory will be overwritten.

25.2 LOADING A PROGRAM FROM A PROGRAM-DATA TAPE AFTER POWER-UP

Operate the red PROGRAM key. This places the INTERVIEW 4600 in the Program Mode and displays the Program Selection menu.

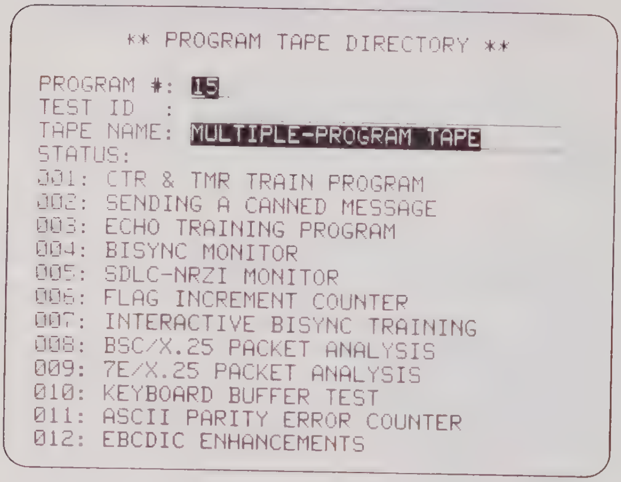
Press the LOAD PROG key, which will display the TAPE LOAD/SAVE menu. The INTERVIEW will first check the tape type, displaying the status message CHECKING TAPE TYPE (Figure 25-3) before LOADING PROGRAM. When the program has been LOADED, the Test ID will be displayed, with the message PROGRAM LOADED (Figure 25-4).

If the 4600 cannot load a program a status message will be put up (as in Figure 25-5). See Appendix D for a list of the messages that may be displayed concerning the Capture Memory.

25.3 LOADING A PROGRAM AUTOMATICALLY AT POWER-UP

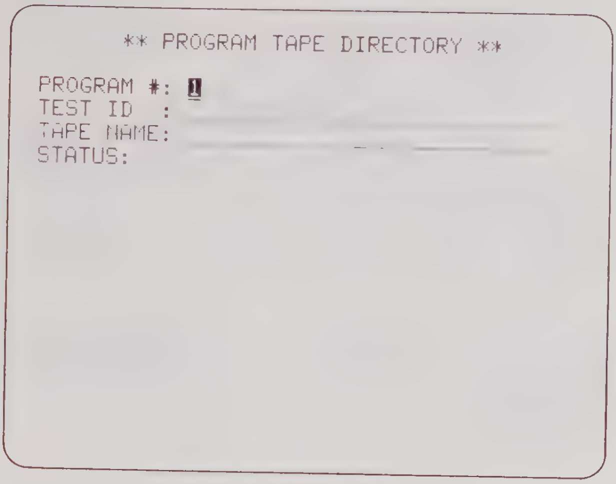
If a program-data tape containing a compatible program is inserted in the tape drive before the INTERVIEW is turned on, the INTERVIEW will load the program automatically when the internal self tests are finished. The message CHECKING TAPE TYPE (see Figure 25-6) will appear on the TAPE line of the power-up menu while the INTERVIEW checks whether a program-data or a multiple-program tape is present. If a program-date tape is present, it is searched for a test program in its protected location. The program is then automatically loaded and its ID displayed on the power-up menu. The INTERVIEW then goes automatically to Run Mode and looks for data in accordance with the program.

If a multiple-program tape is found, the TAPE line will display PROGRAM TAPE INSTALLED (Figure 25-7); if no program is found on the tape, the message will be NO PROGRAM/DIRECTORY FOUND. In either case, the unit will remain in Program Mode.



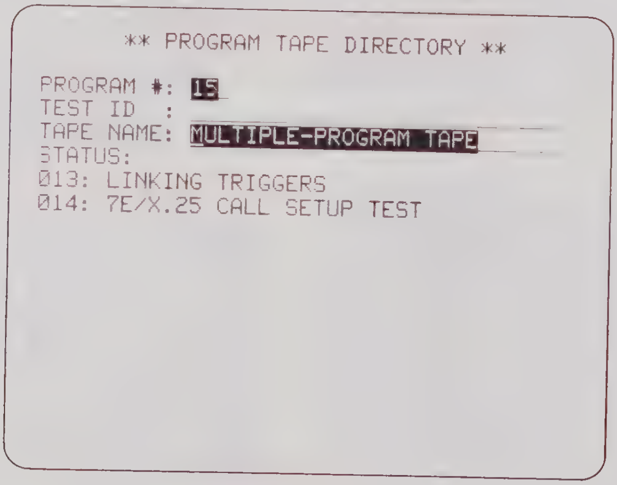
```
        ** PROGRAM TAPE DIRECTORY **

PROGRAM #: 15
TEST ID   :
TAPE NAME: MULTIPLE-PROGRAM TAPE
STATUS:
001: CTR & TMR TRAIN PROGRAM
002: SENDING A CANNED MESSAGE
003: ECHO TRAINING PROGRAM
004: BISYNC MONITOR
005: SDLC-NRZI MONITOR
006: FLAG INCREMENT COUNTER
007: INTERACTIVE BISYNC TRAINING
008: BSC/X.25 PACKET ANALYSIS
009: 7E/X.25 PACKET ANALYSIS
010: KEYBOARD BUFFER TEST
011: ASCII PARITY ERROR COUNTER
012: EBCDIC ENHANCEMENTS
```

Figure 25-8



```
        ** PROGRAM TAPE DIRECTORY **

PROGRAM #: 1
TEST ID   :
TAPE NAME:
STATUS:
```

Figure 25-9



```
        ** PROGRAM TAPE DIRECTORY **

PROGRAM #: 15
TEST ID   :
TAPE NAME: MULTIPLE-PROGRAM TAPE
STATUS:
013: LINKING TRIGGERS
014: 7E/X.25 CALL SETUP TEST
```

Figure 25-10

25.4 MULTIPLE-PROGRAM TAPES: THE TAPE DIRECTORY MENU

If, when the LOAD PROG or the SAVE PROG key is pressed, the logic finds that a multiple-program tape is installed, the Tape Load/Save menu will be briefly displayed with the Status message CHECKING TAPE TYPE; then the Program Tape Directory menu (Figure 25-8) will be displayed. If the 4600 finds a multiple-program tape installed at power-up, it will display PROGRAM TAPE INSTALLED on the TAPE line of the power-up menu (Figure 25-7).

(a) Menu Fields. In the PROGRAM # data-entry field is the decimal number of the first blank program record on the tape. If the tape is either empty (Figure 25-9) or full, the Program # displayed will be 1. The TEST ID line shows the title of the program that is in the unit waiting to be saved, if the Test ID field on the Parameters 1 menu has been filled in. The Tape Name line identifies the tape, if the tape has been previously named.

Below the menu selections is the Program Directory itself, with the list of the record numbers and IDs of all programs (there may be up to 100) on the tape. To see the next page of the directory, use CONTROL plus the DOWN cursor arrow. Use CONTROL plus the UP arrow to return to the previous page. (Compare Figure 25-10 with Figure 25-8.)

(b) Revising the Directory. To erase any program from the directory, enter the record number of the program in the PROGRAM # field and press CONTROL-CLEAR FIELD. That program title will be deleted from the directory, although the program itself will remain on the tape until it is overwritten.

The Program Directory will automatically be revised and saved each time you save a program.

(c) Tape Name. If the tape has been given a name, it will appear on this line. You can name, or rename, the tape simply by typing in the name on this line before you save a program: the tape name will automatically be saved at the same time as the program and the directory. The tape name will then be saved with the revised directory each time you save a program.

To save only the Tape Name and the Tape Directory, enter a 0 (zero) in the Program # field and press the SAVE PROG key.

25.5 RECORDING A PROGRAM ON A MULTIPLE-PROGRAM TAPE

If you wish to record your program in the default record posted on the PROGRAM # line, press SAVE PROG. The status line will display five successive messages:

SAVING PROGRAM.

VERIFYING PROGRAM -- If the program has not been recorded correctly and cannot be verified, this message will be replaced by PROGRAM WRITE ERROR.

SAVING DIRECTORY.

VERIFYING DIRECTORY -- If the directory has not been recorded correctly and cannot be verified, this message will be replaced by DIRECTORY WRITE ERROR.

SAVED.

When this sequence is finished, the new program will have been recorded and also added to the directory.

You can save a program to any program record by writing over the default record number on the PROGRAM # line before you press SAVE PROG.

25.6 LOADING A PROGRAM FROM A MULTIPLE-PROGRAM TAPE

(a) Using the Tape Directory Menu. Insert the tape with the tab in the Protected position and press the LOAD PROG key. The Tape Load/Save menu will be displayed with the status message CHECKING TAPE TYPE.

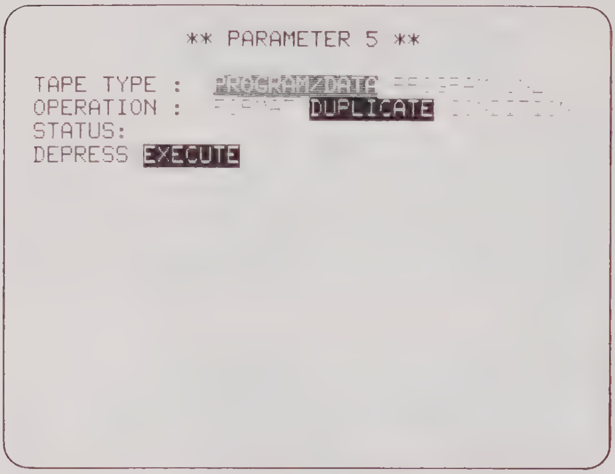
If a Program-Only tape has been inserted, CHECKING TAPE TYPE will change to LOADING DIRECTORY momentarily and then the Program Tape Directory menu will be displayed. On the Program # line will be the number of the first blank record on the tape; on the Test ID line, the ID of the program currently in the unit, if there is one. (Notice that the directory menu does not distinguish between the Load and Save modes.)

Select the program you wish to load by entering its number on the Program # line and press LOAD PROG. LOADING PROGRAM will be shown on the Status line; then PROGRAM LOADED; then the name of the program will come up on the TEST ID line.

(b) Bypassing the Program Tape Directory Menu. If you press the CONTROL and the LOAD PROG keys simultaneously, you will be shown a blank Program Tape Directory Menu. This allows you to load programs from a multiple-program tape whose directory has been lost. This may also be used as a fast method to load a program from a multiple-program tape if the program record number is known.

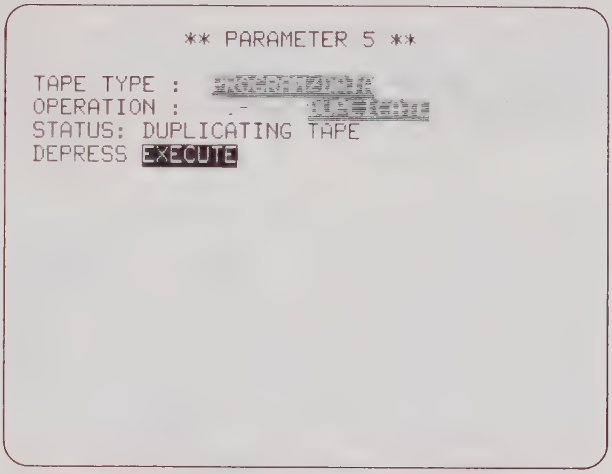
CAUTION: CONTROL-LOAD PROG bypasses the automatic safeguards on the Program Tape Directory. If you use CONTROL-LOAD PROG to quickly enter the Program Tape Directory Menu and then save a program, your directory will then have only one entry: the program you just saved.

26. DUPLICATING TAPES



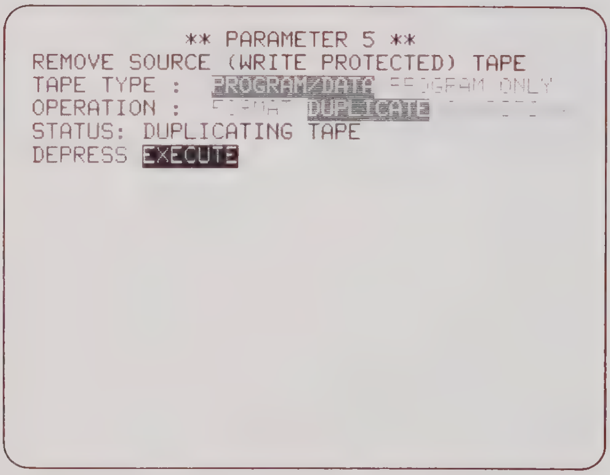
```
           ** PARAMETER 5 **

TAPE TYPE :  PROGRAM/DATA PROGRAM ONLY
OPERATION :  FORMAT DUPLICATE [illegible]
STATUS:
DEPRESS EXECUTE
```

Figure 26-1



```
           ** PARAMETER 5 **

TAPE TYPE :  PROGRAM/DATA
OPERATION :  [illegible] DUPLICATE
STATUS: DUPLICATING TAPE
DEPRESS EXECUTE
```

Figure 26-2



```
           ** PARAMETER 5 **
REMOVE SOURCE (WRITE PROTECTED) TAPE
TAPE TYPE :  PROGRAM/DATA PROGRAM ONLY
OPERATION :  FORMAT DUPLICATE [illegible]
STATUS: DUPLICATING TAPE
DEPRESS EXECUTE
```

Figure 26-3

26
DUPLICATING TAPES

CAUTION: If the unit used for duplicating has the High-Speed Memory option (OPT 05), its data content will be overwritten during the tape duplication process.

26.1 FORMATTING AND CONDITIONING

The 4600 will copy the formatting of the source program-data tape during duplication and pad out any empty blocks at the end of the destination tape. The destination tape will be retensioned automatically during the duplication process.

26.2 DUPLICATION PROCEDURE

On the Parameters 5 menu, select DUPLICATE (Figure 26-1). Set the tab on the SOURCE tape (that is, the tape you want to copy) to the inside, or PROTECTED, position; set the tab on the DESTINATION tape (that is, the new tape) to the outside, or RECORD, position.

Install the source tape. Press the EXECUTE key. The message DUPLICATING TAPE will appear on the Status line (Figure 26-2). When the 4600 has copied as much as it can from the source tape, it will use line 2 to ask you (see Figure 26-3) to

REMOVE SOURCE (WRITE PROTECTED) TAPE.

If there is no tape in the drive when you press EXECUTE, the 4600 will use Line 2 to ask you to

INSERT SOURCE (WRITE PROTECTED) TAPE.

If the tape in the unit has the tab in the RECORD position, the 4600 will assume it is not the source tape and ask you to

REMOVE DESTINATION (WRITE ENABLED) TAPE

and then, once you have removed the tape, to

INSERT SOURCE (WRITE PROTECTED) TAPE.

When the source tape has been copied and removed, line 2 will ask you to

INSERT DESTINATION (WRITE ENABLED) TAPE.

After all the temporarily stored data has been transferred to the destination tape, you will be asked to insert the source tape again.

Thus, the 4600 will guide you through the number of tape swaps necessary to copy the entire tape on the destination tape. If your 4600 has the High-Speed Memory (RAM) option, it will automatically use it to store the content of the source tape. With the 1-Megabit RAM, a maximum of 5 tape exchanges will be required; with 4-Megabit RAM, a maximum of 3 exchanges. Without RAM, up to 101 tape exchanges may be required.

When the process has been completed, TAPE DUPLICATED will appear on the Status line.

27. PRINTER CONTROL

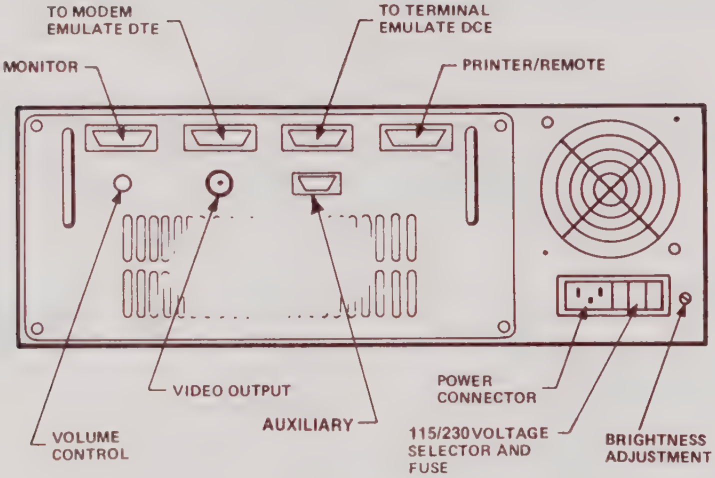
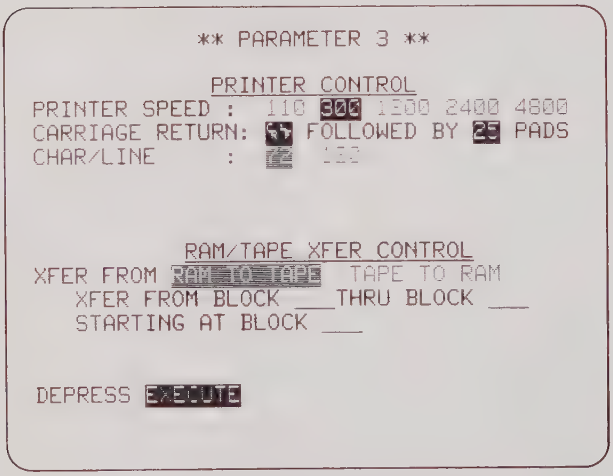


Figure 27-1



```
                    ** PARAMETER 3 **

                     PRINTER CONTROL
PRINTER SPEED :  110 300 1200 2400 4800
CARRIAGE RETURN: ␍ FOLLOWED BY 25 PADS
CHAR/LINE      :  72  132


                  RAM/TAPE XFER CONTROL
XFER FROM RAM TO TAPE  TAPE TO RAM
   XFER FROM BLOCK ___THRU BLOCK ___
   STARTING AT BLOCK ___


DEPRESS EXECUTE
```

Figure 27-2

27
PRINTER CONTROL

The 4600 will control most asynchronous ASCII printers. You may print not only static displays -- frozen data displays, frozen frame or packet protocol trace displays, Results, and all program menus except the summaries -- but also any data or frame or packet protocol as it is being played back from tape or RAM.

27.1 INTERCONNECTION

There is a separate female RS-232/V.24-type PRINTER/REMOTE interface connector on the rear of the INTERVIEW 4600 for connection to a printer (see Figure 27-1). The 4600 transmits to the printer on Pin 3 (RD). The 4600 also applies an ON voltage (+12 V) on Pins 5 (CTS), 6 (DSR), and 8 (RLSD). It monitors Pin 20 (DTR). When DTR goes OFF the 4600 stops transmitting on Pin 3. When DTR goes back on, the 4600 resumes transmitting. Information is transmitted in even-parity ASCII (7 information bits). Your printer should be set to receive information in this format.

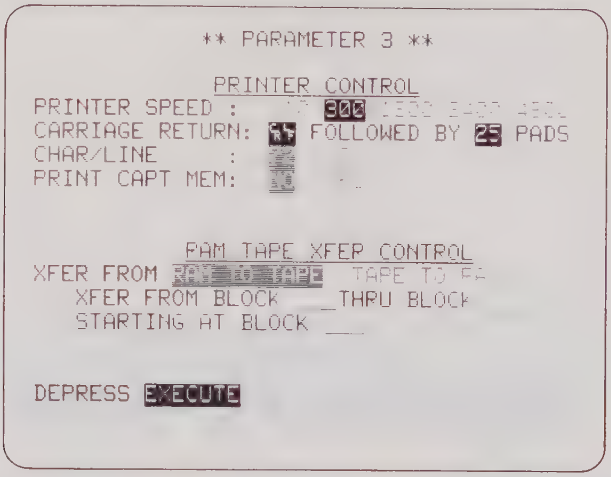
27.2 PRINTER CONTROL MENU

The Parameters 3 Printer Control menu (Figure 27-2) must be filled out before you attempt to print any display.

(a) Printer Speed. In this selection field, you set the 4600 to match the speed of your printer. The selections are 110, 300, 1200, 2400, and 4800 baud. The default value is 300.

(b) Carriage Return. In the first data-entry field on this line, insert the carriage-return character or characters appropriate for your printer. The default characters are the ASCII control characters CR LF. In the second field, insert the number of pad characters that must follow the carriage return instruction in order to give the printer time to perform the carriage return. The default value is 25 pads.

(c) Characters per Line. Select the number of printed characters per line. The choices are 72 (the default value) and 120. If your printer's line



```
                 ** PARAMETER 3 **

                  PRINTER CONTROL
PRINTER SPEED :    [illegible] 300 1200 2400 4800
CARRIAGE RETURN: LF FOLLOWED BY 25 PADS
CHAR/LINE      : [illegible]
PRINT CAPT MEM: [illegible]


               RAM TAPE XFER CONTROL
XFER FROM RAM TO TAPE  TAPE TO RA
   XFER FROM BLOCK __THRU BLOCK
   STARTING AT BLOCK ___


DEPRESS EXECUTE
```

Figure 27-3 Printer Control menu when tape or RAM has been selected as data source.

TABLE 27-1

SPECIAL CHARACTER REPRESENTATIONS ON PRINTOUTS

CRT Display	Printout
Normal characters	Character is preceded by and followed by a space.
Special characters: 7E (Flag), Bit Mask, G or B (BCC), A (Abort), DC (Don't Care)	Character representation (one or two printed characters) is preceded by a colon.
Don't Care	:DC (upper case)
Not Equal (bar through character)	- (dash) precedes character. (equal sign) replaces the colon preceding special characters.
Control characters	Lower-case mnemonic (displayed as a space followed by two lower-case printed characters)
Hexadecimal characters	Displayed as a space followed by two printed characters

length is 72 characters or less, choose 72. If your printer's line length is greater than 72 and less than 120, choose 120. The 4600 will not output more than 120 characters per line.

(d) Print Capture Memory. This field (Figure 27-3) does not appear unless TAPE or RAM has been selected as data source on the Parameters 1 menu. The default selection is NO. If you select YES, then the content of either tape or RAM, whichever was selected on the Parameters 1 menu, will be printed when the unit enters Run Mode.

27.3 PRINTOUT PROCEDURES

(a) Static Displays. To obtain a printout of any allowed static display, fill out the Parameters 3 menu, display the material to be printed, and press the yellow PRINT key. The display will automatically be printed. Press PROGRAM to abort a print (depending on the size of your printer's data buffer, there may be a delay of several lines before printing stops).

The static displays that can be printed are program menus, frozen data and frame or packet protocol displays, the Statistics display, and the Results display. The Trigger and Message Summaries, Program Summary, and Self Test display cannot be printed. Data displays cannot be printed from Halt Mode.

You may print groups of menus as follows:

(1) Display the Program Selections menu (press the PROGRAM key) to print the entire program presently in the unit, including all default menus.

(2) Press PARAMETERS, then PRINT, to print the Parameters 1, 2, and 4 menus.

(3) Display the Trigger Summary to print all trigger Conditions and Actions menus.

(4) Display the Message Summary to print all message menus.

(b) Capture Memory Playback. To print the data content of either Tape or RAM, select TAPE or RAM as source on the Parameters 1 menu, and CAPTURE MEMORY: YES on the Parameters 3 menu. Press the RUN key, and the data will automatically be printed as it is played back from the block selected on Parameters 1. The tape or RAM playback speed selected on Parameters 1 will be overridden by the Printer Speed selected on Parameters 3.

27.4 PRINTED FORMAT

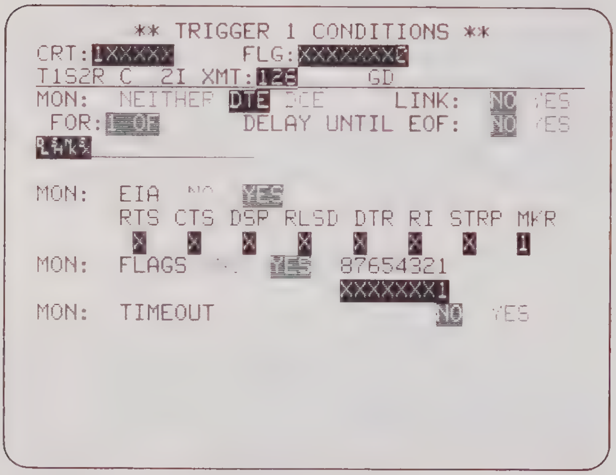
(a) Program Menus. Most program menus can be adequately represented by 70 character-per-line printouts. The printout will correspond 1:1 with most characters on the display. However, each character in a data-entry field is allotted three positions on the printout. This prevents control characters from being read by the printer and allows special characters such as hexadecimal or bit masks to be represented with standard alphanumeric characters. The symbols used for these and other characters are defined in Table 27-1.

```
** TRIGGER 1 CONDITIONS **

MON:   DTE
LINK:   NO
FOR:   1 OF
DELAY UNTIL EOF:   NO     dl  sh  nk  sx
MON:   EIA   YES
     X    X    X    X    X    X    X    1
MON:   FLAGS   YES
     XXXXXXX1
MON:   TIMEOUT   NO
```

Figure 27-4 Printout of the trigger menu shown in Figure 27-6.

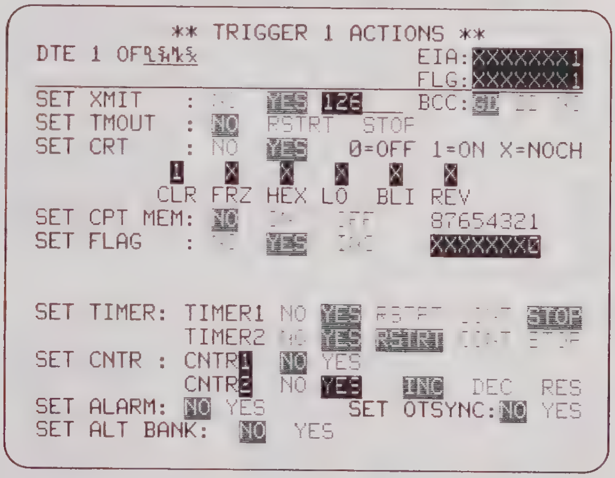
```
** TRIGGER 1 ACTIONS **

SET XMIT     :   YES    126
BCC:   GD
SET TMOUT    :   NO
SET CRT      :   YES
     1    X    X    X    X    X
SET CPT MEM:   NO
SET FLAG     :   YES    XXXXXXX0
SET TIMER:  TIMER1   YES    STOP
TIMER2   YES    RSTRT
SET CNTR :  CNTR   1    NO
CNTR   2    YES    INC
SET ALARM:   NO
SET OTSYNC:   NO
SET ALT BANK:   NO
```

Figure 27-5 Printout of the trigger menu shown in Figure 27-7.



```
        ** TRIGGER 1 CONDITIONS **
CRT:1XXXXX      FLG:XXXXXXX0
T1S2R C  2I XMT:126       GD
MON:   NEITHER DTE DCE       LINK:   NO  YES
 FOR:1 OF         DELAY UNTIL EOF:   NO  YES
dlshnksx

MON:   EIA   NO  YES
       RTS CTS DSP RLSD DTR RI STRP MKR
        X   X   X   X    X   X   X   1
MON:   FLAGS   NO  YES  87654321
                        XXXXXXX1
MON:   TIMEOUT                   NO  YES
```

Figure 27-6



```
          ** TRIGGER 1 ACTIONS **
DTE 1 OFdlshnksx                  EIA:XXXXXXX1
                                  FLG:XXXXXXX1
SET XMIT    :  NO   YES  126      BCC:GD  BD  NO
SET TMOUT   :  NO   RSTRT  STOF
SET CRT     :  NO   YES    0=OFF 1=ON X=NOCH
               1    X    X    X    X    X
             CLR  FRZ  HEX  LO   BLI  REV
SET CPT MEM:   NO   ON   OFF     87654321
SET FLAG    :  NO   YES  INC     XXXXXXX0


SET TIMER:  TIMER1 NO YES RSTRT CONT STOP
            TIMER2 NO YES RSTRT CONT STOP
SET CNTR :  CNTR1  NO YES
            CNTR2  NO YES   INC  DEC  RES
SET ALARM:  NO YES           SET OTSYNC:NO  YES
SET ALT BANK:   NO   YES
```

FIGURE 27-7

```
DESTINATION:   LINE
TEXT:      T   h   e   sp  q   u   i   c   k   sp  b   r   o   w   n
           f   o   x   sp  a   t   e   sp  t   h   e
           l   a   z   y   sp  d   o   g   .
```

FIGURE 27-8

Figures 27-4 and 27-5 are printouts of the trigger menus shown in Figures 27-6 and 27-7. Figure 27-8 shows how each text-entry line on a Message Entry menu will be printed on two lines on a 70-char/line printout. Although control characters can be entered in the Test ID field on the Parameters 1 menu, a control character in that field will be printed out as a space.

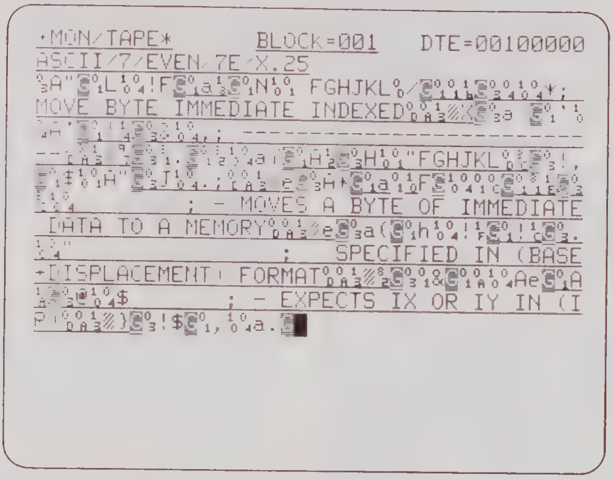
(b) Manual Data Freeze. The status information on Lines 1 and 2 will be printed, but the binary character breakdown shown at the right of these lines will not be printed (compare Figures 27-9 and 27-10).

Data is printed without any enhancements, and only the new data -- up to the cursor position -- is printed. In single-line mode, the printout does not distinguish between TD and RD data. The frozen single-line data display shown in Figure 27-9 looks like Figure 27-10 when it is printed out at 72 characters per line.

When DUAL-line display has been selected on the Parameters 2 menu, all data is printed in dual-line format (compare Figures 27-11 and 27-12). A line of TD data is followed by a line of RD data and then a line feed. Thus, the data line following a blank line is always TD data. Dots replace the L-shaped fill symbols (three dots for each character time).

The 4600 automatically converts all data to ASCII before it is sent to the printer interface. All characters for which there are no ASCII equivalents are sent to the printer as hexadecimal.

Each data character is allotted three spaces on the printout to accommodate control characters and hexadecimal. If you select 70 characters per line, therefore, the printout will show only 20 characters per line and will not correlate directly with the CRT display. (Compare Figures 27-11 and 27-12.) If you select 120 characters per line, the printout will correspond line for line with the CRT display.

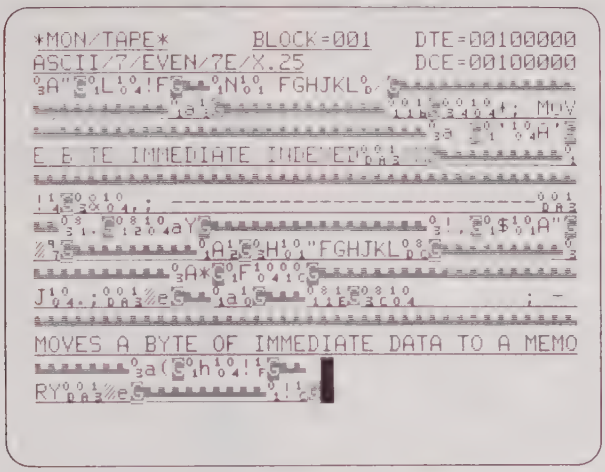


```
*MON/TAPE*          BLOCK=001    DTE=00100000
ASCII/7/EVEN/7E/X.25
MOVE BYTE IMMEDIATE INDEXED
               ; - MOVES A BYTE OF IMMEDIATE
 DATA TO A MEMORY
                       ;    SPECIFIED IN (BASE
+DISPLACEMENT) FORMAT
                  ; - EXPECTS IX OR IY IN (I
```

Figure 27-9

```
*MON/TAPE*       BLOCK=001
ASCII/7/EVEN/7E/X.25

 03  A   "  :G   01  L   10  04  !   F  :G   01  a   18:G   01  N   10  01  sp
     F   G   H   J   K   L   0D  /  :G   01  01  16:G   03  04  10  04  *   ;   sp

 M   O   V   E   sp  B   Y   T   E   sp  I   M   M   E   D   I   A   T   E   sp
     I   N   D   E   X   E   D   0D  0A  13  pd  X  :G   03  a   sp:G   01  '   10

 04  A   '  :G   01  !   14:G   03  &   10  04  ,   ;   sp  -   -   -   -   -
     -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -

 -   -   0D  0A  13  pd  97:G   03  81  .  :G   01  82  10  04  a   Y  :G   01
     A   12:G   03  H   10  01  "   F   G   H   J   K   L   0D  8C:G   03  !   "

:G   01  $   10  01  A   "  :G   03  J   10  04  .   ;   0D  0A  13  pd  @  :G
     03  (   *  :G   01  a   01  10  F  :G   10  04  01  0C:G   01  81  1E:G   03

 9C  10  04  sp  sp  sp  sp  sp  sp  sp  sp  ;   sp  -   sp  M   O   V   E   S
     sp  A   sp  B   Y   T   E   sp  O   F   sp  I   M   M   E   D   I   A   T   E

 sp  D   A   T   A   sp  T   O   sp  A   sp  M   E   M   O   R   Y   0D  0A  13
     pd  @  :G   03  a   (  :G   01  h   10  04  !   1F:G   01  '   1C:G   03  .

 10  04  "   sp  sp  sp  sp  sp  sp  sp  sp  sp  sp  sp  sp  sp  sp  sp  ;   sp
     sp  sp  S   P   E   C   I   F   I   E   D   sp  I   N   sp  (   B   A   S   E

 +   D   I   S   P   L   A   C   E   M   E   N   T   )   sp  F   O   R   M   A
     T   0D  0A  13  pd  82:G   03  01  &  :G   01  0A  10  04  A   @  :G   01  A

 1A:G   03  @   10  04  $   sp  sp  sp  sp  sp  sp  sp  ;   sp  -   sp  E   X
     P   E   C   T   S   sp  I   X   sp  O   R   sp  I   Y   sp  I   N   sp  (   I

 R   )   0D  0A  13  pd  )  :G   03  !   $  :G   01  ,   10  04  a   .  :G
```

Figure 27-10 Printout of data screen shown in Figure 27-9.



```
*MON/TAPE*      BLOCK=001    DTE=00100000
ASCII/7/EVEN/7E/X.25         DCE=00100000
E B TE IMMEDIATE INDE ED
MOVES A BYTE OF IMMEDIATE DATA TO A MEMO
RY
```

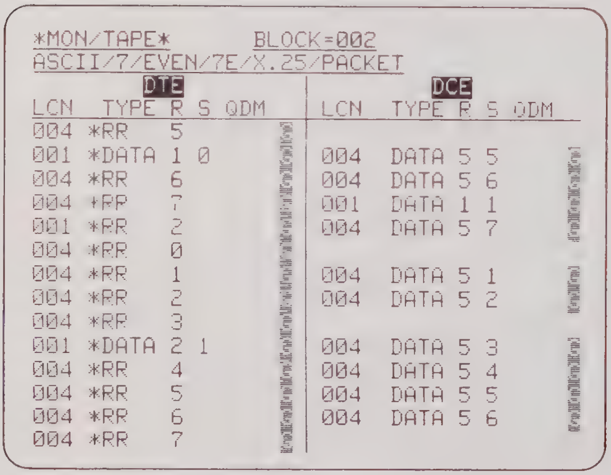
Figure 27-11

```
*MON/TAPE*        BLOCK=001
ASCII/7/EVEN/7E/X.25

 03 A  " :G  01 L  10 04 !  F :G ...... 01 N  10 01 sp F  G
.............................. 01 a  18:G .................
   H  J  K  L  OD / :G ....................................
   .................. 01 01 16:G  03 04 10 04 *  ;  sp M  O  V

...........................................................
 E  sp B  Y  T  E  sp I  M  M  E  D  I  A  T  E  sp I  N  D
   ....................... 03 .  sp:C  01 '  10 04 A  " :G
   F  X  E  D  OD OA 13 pd X .G .......................... 01

...........................................................
 '  14:G  03 &  10 04 ,  ;  sp -  -     -  -  -  -  -  -  -
   ............................................................
   -  -  -  -     -  -     -  -  -  -  -  -  -  -  -  OD OA 13

...... 03 81 .  :G  01 82 10 04 a  Y :G ...................
 pd 97:G ........................ 01 A  12:G  03 H  10 01
   ....................... 03 !  .  :G  01 $  10 01 A  " :G
   "  F  G  H  J  K  L  OD 8C:G ........................ 03

.............................. 03 A  * :G  01 F  10 04 01 OC
 J  10 04 .  ;  OD OA 13 pd e :G ...... 01 a  10:G ........
   :G .........................................................
   01 81 1E:G  03 8C 10 04 sp sp sp sp sp sp sp sp ;  sp -  sp

...........................................................
 M  O  V  E  S  sp A  sp B  Y  T  E  sp O  F  sp I  M  M  E
   ............................................................
   D  I  A  T  E  sp D  A  T  A  sp T  O  sp A  sp M  E  M  O

..................... 03 a  ( :G  01 h  10 04 !  1F:G ......
 R  Y  OD OA 13 pd e :G .......................... 01 !  1C
   sp
  :G
```

Figure 27-12 Printout of data screen shown in Figure 27-11.

```
*MON/TAPE*          BLOCK=002
ASCII/7/EVEN/7E/X.25/PACKET

              DTE                                            DCE
LCN    TYPE  R  S          QDM           LCN    TYPE  R  S           QDM
004  *RR     5                 G
001  *DATA  1  0               G         004   DATA  5  5                G
004  *RR     6                 G         004   DATA  5  6                G
004  *RR     7                 G         001   DATA  1  1                G
001  *RR     2                 G         004   DATA  5  7                G
004  *RR     0                 G
004  *RR     1                 G         004   DATA  5  1                G
004  *RR     2                 G         004   DATA  5  2                G
004  *RR     3                 G
001  *DATA  2  1               G         004   DATA  5  3                G
004  *RR     4                 G         004   DATA  5  4                G
004  *RR     5                 G         004   DATA  5  5                G
004  *RR     6                 G         004   DATA  5  6                G
004  *RR     7                 G
```

Figure 27-13 Printout of Protocol Mnemonic display shown in Figure 27-14.



```
*MON/TAPE*        BLOCK=002
ASCII/7/EVEN/7E/X.25/PACKET
           DTE                            DCE
LCN   TYPE  R  S  QDM     LCN   TYPE  R  S  QDM
004  *RR    5
001  *DATA  1  0          004   DATA  5  5
004  *RR    6             004   DATA  5  6
004  *RP    7             001   DATA  1  1
001  *RR    2             004   DATA  5  7
004  *RR    0
004  *RR    1             004   DATA  5  1
004  *RR    2             004   DATA  5  2
004  *RR    3
001  *DATA  2  1          004   DATA  5  3
004  *RR    4             004   DATA  5  4
004  *RR    5             004   DATA  5  5
004  *RR    6             004   DATA  5  6
004  *RR    7
```

Figure 27-14

```
PROGRAM #:   15
TEST ID   :
TAPE NAME:   MULTIPLE-PROGRAM TAPE

001: CTR & TMR TRAIN PROGRAM
002: SENDING A CANNED MESSAGE
003: ECHO TRAINING PROGRAM
004: BISYNC MONITOR
005: SDLC-NRZI MONITOR
006: FLAG INCREMENT COUNTER
007: INTERACTIVE BISYNC TRAINING
008: BSC/X.25 PACKET ANALYSIS
009: 7E/X.25 PACKET ANALYSIS
010: KEYBOARD BUFFER TEST
011: ASCII PARITY ERROR COUNTER
012: EBCDIC ENHANCEMENTS
013: LINKING TRIGGERS
014: 7E/X.25 CALL SETUP TEST
```

Figure 27-15 Program Tape Directory.

(c) Frozen Frame or Packet Protocol Display. With the exception of a few hexadecimal characters, printouts of the frame or packet protocol display correlate character for character with the CRT display. Figure 27-13 is the printout of the display in Figure 27-14.

(d) Capture Memory Playback. Data can be played back directly to the printer when the tape or RAM is selected as source. The printout will use three character spaces for each data character. Since there are 40 characters per line on the CRT, you should select 120 if you want a line of the printout to correlate with a line of the CRT display.

Taped data may be played back to both CRT and printer simultaneously. If SINGLE or DUAL line has been selected on the Parameters 2 menu, the data will be printed in the same manner as for static data display (see Section 27-4b). The two status lines will be repeated at the top of the form; that is, after every 40 printed lines of single-line data (at 120 characters per line).

(e) Frame and Packet Format. If FRAME or PACKET is selected, both the status lines and the column headings seen at the top of the CRT display will be repeated on the printout at the top of the form; that is, after every 58 printed lines of protocol.

(f) Program Tape Directory. You can print the entire Program Tape Directory by pressing the PRINT key while the Program Directory menu is displayed (see Figure 27-15).

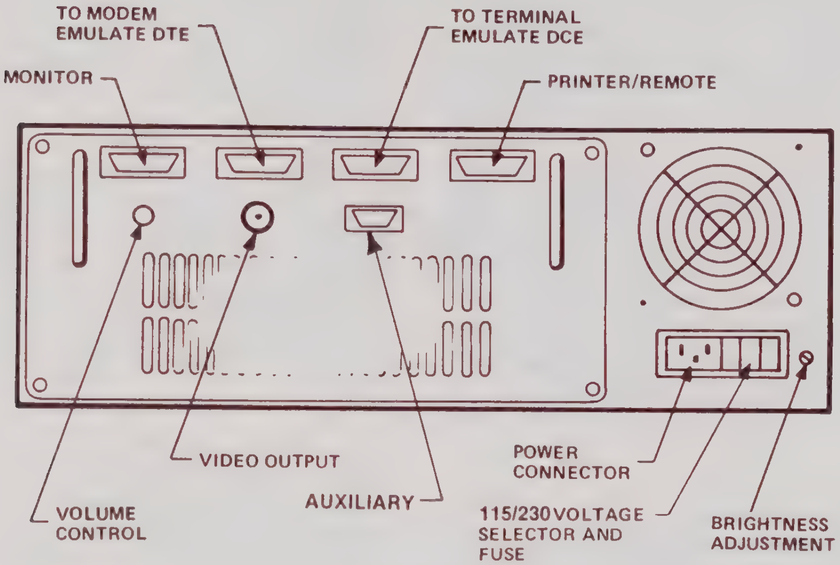

TO MODEM
EMULATE DTE
TO TERMINAL
EMULATE DCE
MONITOR
PRINTER/REMOTE
VIDEO OUTPUT
POWER
CONNECTOR
AUXILIARY
VOLUME
CONTROL
115/230 VOLTAGE
SELECTOR AND
FUSE
BRIGHTNESS
ADJUSTMENT

Figure 28-1

28

THE EMULATE MODES: INTERACTIVE TESTING

28.1 EMULATE MODES

Interactive testing is selected on Line 4 of the Parameters 1 menu as one of two modes, EMulate DTE or EMulate DCE.

When you select EMulate DCE on the Parameters 1 menu, the 4600 assumes that it is transmitting on RD, expects to receive its own transmissions at the RD receivers, and expects any other data (whether from the line or from the Capture Memory) to arrive on TD. If you choose Emulate DTE on Parameters 1, the 4600 assumes it is transmitting on TD, expects to receive its own transmissions at the TD receivers, and expects any other data to come in on RD.

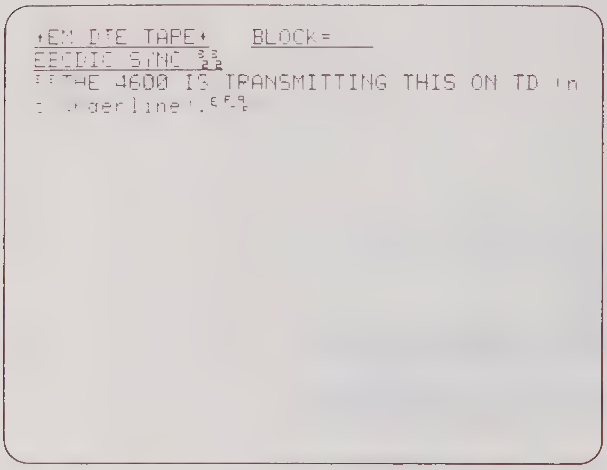
Therefore, it is important to correctly correlate the Emulate mode with the data connection at the rear of the unit.

28.2 CONNECTING THE TRANSMITTER

The 4600's transmitter is switched between RD and TD by moving the data line between the EM DCE (TO TERMINAL) connector and the EM DTE (TO MODEM) connector on the rear of the unit (see Figure 28-1). When the line is connected to the EM DCE connector, the 4600 transmits on RD, receives its own transmissions at its RD receivers, and receives incoming data at its TD receivers. When the data line is connected to the EM DTE connector, the 4600 transmits on TD, receives its own transmissions at its TD receivers, and receives incoming data at its RD receivers.

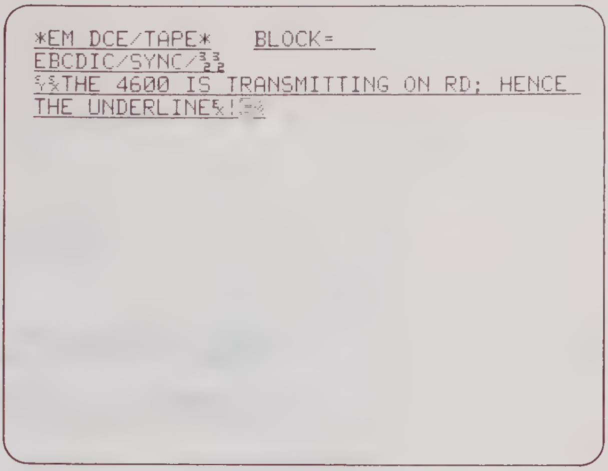
> NOTE: When TAPE is selected for data SOURCE and EM DTE or EM DCE for MODE on the Parameters 1 menu, data from the tape will be played back on both Emulate connectors: DTE data on the EM DTE connector and DCE data on the EM DCE connector. Only taped data from the side of the line opposite that selected for MODE will be displayed, however.

Connecting the data line to the MONITOR port disconnects the transmitter and ensures that the 4600 cannot affect the monitored line. This connector should be used when you select a Monitor mode on the Parameters 1 menu.



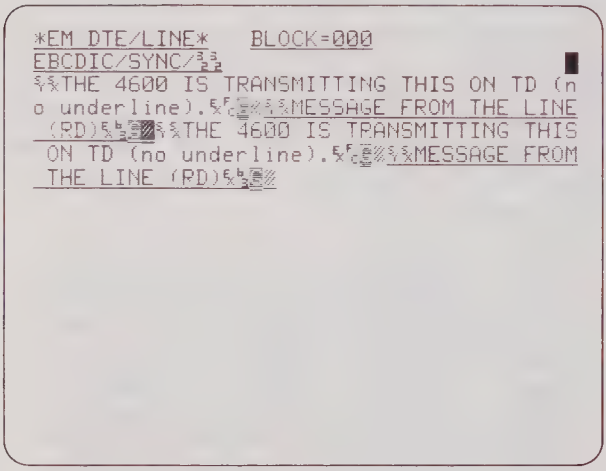
```
*EM DTE/TAPE*    BLOCK=
EBCDIC/SYNC/³₂³₂
ˢʏˢₓTHE 4600 IS TRANSMITTING THIS ON TD (n
o underline).ᴱₓᶠc
```

Figure 28-2



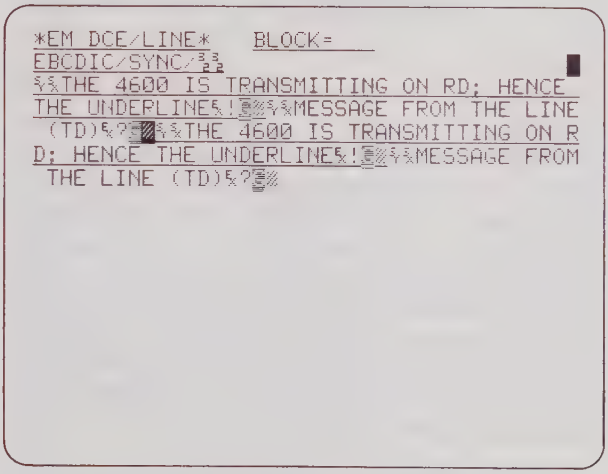
```
*EM DCE/TAPE*    BLOCK=
EBCDIC/SYNC/³₂³₂
ˢʏˢₓTHE 4600 IS TRANSMITTING ON RD; HENCE
THE UNDERLINEᴱₓ!▤▨
```

Figure 28-3



```
*EM DTE/LINE*    BLOCK=000
EBCDIC/SYNC/³₂³₂                          █
ˢʏˢₓTHE 4600 IS TRANSMITTING THIS ON TD (n
o underline).ᴱₓᶠc▤▨ˢʏˢₓMESSAGE FROM THE LINE
 (RD)ᴱₓᵇ₂▤▨ˢʏˢₓTHE 4600 IS TRANSMITTING THIS
 ON TD (no underline).ᴱₓᶠc▤▨ˢʏˢₓMESSAGE FROM
 THE LINE (RD)ᴱₓᵇ₂▤▨
```

Figure 28-4



```
*EM DCE/LINE*    BLOCK=
EBCDIC/SYNC/³₂³₂                          █
ˢʏˢₓTHE 4600 IS TRANSMITTING ON RD; HENCE
THE UNDERLINEᴱₓ!▤▨ˢʏˢₓMESSAGE FROM THE LINE
 (TD)ᴱₓ?▤▨ˢʏˢₓTHE 4600 IS TRANSMITTING ON R
D; HENCE THE UNDERLINEᴱₓ!▤▨ˢʏˢₓMESSAGE FROM
 THE LINE (TD)ᴱₓ?▤▨
```

Figure 28-5

28.3 DISPLAY

To interpret the display when the 4600 is in an interactive mode, first check the status information on line 1 (see Figures 28-2 and 28-3). Notice that in Emulate DTE Mode (Figure 28-2), data transmitted by the 4600 is always displayed as DTE data with no underline; for Emulate DCE (Figure 28-3), data transmitted by the 4600 is underlined as for received DCE data. In the Emulate modes, what you see on the screen as transmitted data is always what is actually transmitted on line by the 4600. Thus, the block check characters you see in Figure 28-2 are those actually transmitted by the 4600 (Received Block Check is off in this example), and in Figure 28-3 you see the second block check character replaced by G after the 4600 does a received block check on its own transmitted data and compares it with its transmitted BCC.

In Figures 28-4 and 28-5, you see both transmitted and received data. Always check Line 1 of the display to be sure which data is being transmitted by the 4600. In Figure 28-4 the 4600 is transmitting on TD so transmitted data is not underlined. In Figure 28-5, it is transmitting on RD so the transmitted data is underlined.

The 4600's transmitter is controlled by triggers. You may pre-enter up to 16 messages (see Section 30), for a total of up to 1024 bytes of message content. You can also send a standard stored message, transmit the output of the "transmit variable" counter, echo received data, and type in messages from the keyboard in Run Mode. You can use the triggers to send messages in any sequence (see Section 31.1), or you can obtain manual control through the Marker (ENTER key; see Section 31.2).

TABLE 29-1

INTERFACE LEADS CONTROLLED BY THE 4600 RS-232/V.24 LEAD

RS-232/V.24				Em DTE Mode	Em DCE Mode	Monitor Mode
Pin	Name	EIA	CCITT			
2	TD	BA	103	Driven by 4600	GND via 3 kohms	Input to 30-kohm receiver
3	RD	BB	104	GND via 3 kohms	Driven by 4600	Input to 30-kohm receiver
20	DTR	CD	108/2	Driven by 4600	GND via 4.7 kohms	Input to 30-kohm receiver
4	RTS	CA	105	Driven by 4600	GND via 4.7 kohms	Input to 30-kohm receiver
8	RLSD	CF	109	GND via 4.7 kohms	Driven by 4600	Input to 30-kohm receiver
5	CTS	CB	106	GND via 4.7 kohms	Driven by 4600	Input to 30-kohm receiver
22	RI	CE	125	GND via 4.7 kohms	Driven by 4600	Input to 30-kohm receiver
15	SCT	DB	114	GND via 3 kohms	Driven by 4600	Input to 30-kohm receiver
17	SCR	DD	115	GND via 3 kohms	Driven by 4600	Input to 30-kohm receiver
24	SCTE	DA	113	Driven by 4600	GND via 3 kohms	Input to 30-kohm receiver
6	DSR	CC	107	GND via 4.7 kohms	Driven by 4600	Input to 30-kohm receiver

29

INTERFACE LEAD CONTROL

When a data line is connected to one of the Emulate ports on the rear of the 4600, the 4600 assumes control of the RS-232/V.24 interface. There is no need to program the lead activity for each transmission: On the Parameters 4 menu you select, in advance, the sequence of lead activity and the delays you want, and this "envelope" is automatically used each time a message is sent.

Section 29.1 explains interface lead control by the 4600 in electrical terms. Sections 29.2 through 29.6 describe the Parameters 4 menu selections that you use to set up the 4600 for various interface control configurations.

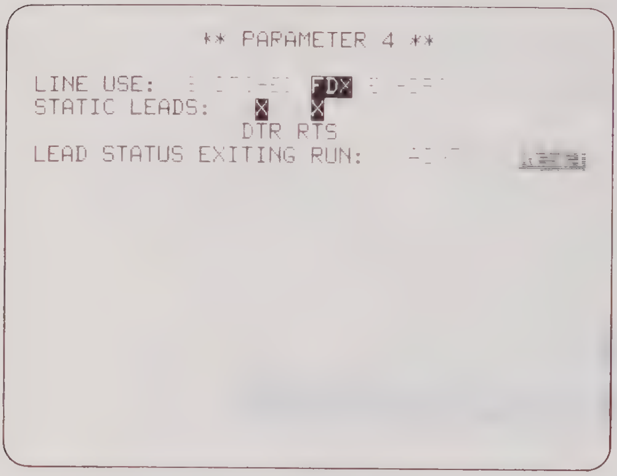
29.1 LEADS DRIVEN BY THE INTERVIEW

In order to use either of the 4600's two Emulate modes, you must break the line and connect it to one of the two Emulate connectors on the rear of the unit. In EM DCE mode, if you have used the correct connector for the mode selection, the 4600 will control leads usually controlled by the modem; in EM DTE mode, it will control leads usually controlled by the data terminal equipment.

When you power up the 4600 and plug your equipment into one of its two Emulate connectors, the 4600 will immediately, without waiting for Run Mode, apply an OFF voltage as defined by the RS-232/V.24 standard to each of the leads that it controls in that emulate mode. These leads are specified in Table 29-1.

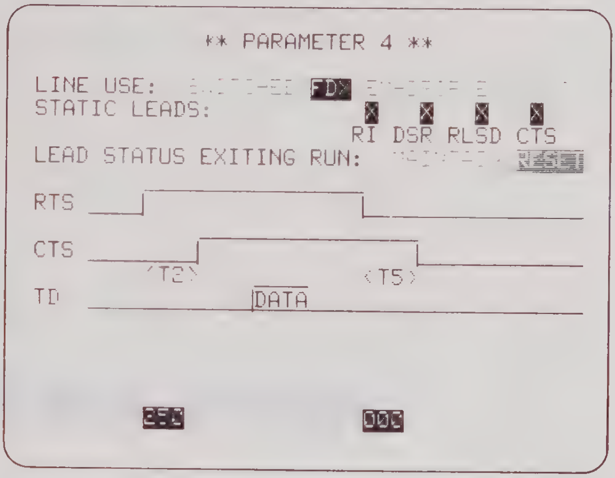
NOTE: The terms ON and OFF imply that an RS-232/V.24 lead is driven to either ON or OFF voltage in accordance with the RS232/V.24 standard. The standard defines a signal as OFF when it is more negative than -3 volts with respect to signal ground. A signal is defined as ON when it is more positive than +3 volts with respect to signal ground. Thus, OFF always implies that the lead is driven to the OFF state and we use the term inactive to mean that a lead is not being driven ON or OFF.

If you make any changes in either the LINE USE or STATIC LEADS field of the Parameters 4 menu, your changes will become effective when the unit enters Run Mode.



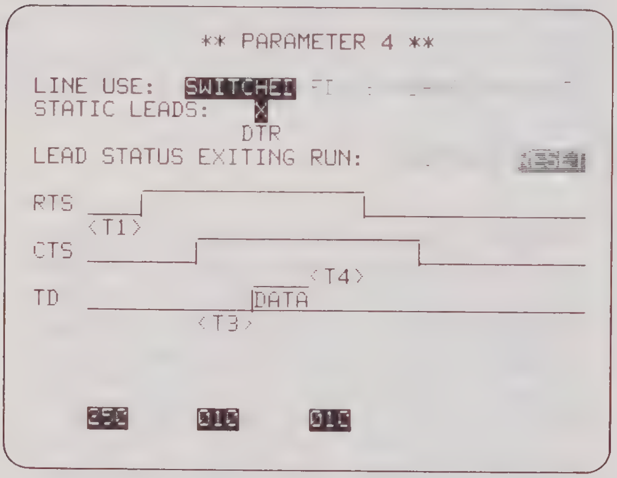
```
** PARAMETER 4 **
LINE USE:          FDX
STATIC LEADS:    ☒    ☒
                DTR  RTS
LEAD STATUS EXITING RUN:        RESET
```

Figure 29-1 EM DTE, FDX Mode (default).



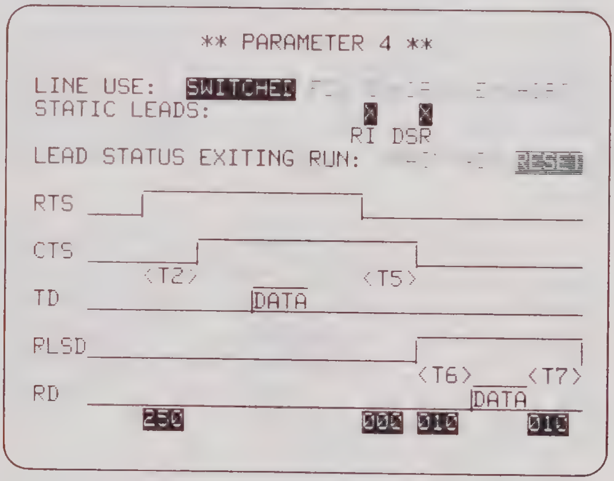
```
** PARAMETER 4 **
LINE USE:          FDX
STATIC LEADS:               ☒    ☒    ☒    ☒
                           RI  DSR  RLSD  CTS
LEAD STATUS EXITING RUN:              RESET
```

Figure 29-2 EM DCE, FDX Mode (default).



```
** PARAMETER 4 **
LINE USE: SWITCHED
STATIC LEADS:    ☒
                DTR
LEAD STATUS EXITING RUN:        RESET
```

Figure 29-3 EM DTE, SWITCHED Mode.



```
** PARAMETER 4 **
LINE USE: SWITCHED
STATIC LEADS:             ☒    ☒
                         RI  DSR
LEAD STATUS EXITING RUN:         RESET
```

Figure 29-4 EM DCE, SWITCHED Mode.

29.2 LINE USE (LINE 3)

LINE USE is the first field on the Interface Control menu (Parameters 4). In conjunction with the Mode selection on the Parameters 1 menu, the Line Use selection determines what selections will appear on the remainder of the Parameters 4 menu (Figure 29-1). Table 29-2 summarizes these relationships for your reference as you follow this discussion.

29.2.1 Full-Duplex Operation

The default selection is FDX, for full-duplex or continuous carrier use. Figures 29-1 and 29-2 show the default Parameters 4 menu for Emulate DTE and Emulate DCE modes, respectively. In FDX mode, the active static leads are set to the states assigned them in the Static Leads field. When a trigger transmit action comes true, the 4600 will transmit data immediately, regardless of the status of any of the interface leads.

29.2.2 Half-Duplex Use

For half-duplex use, select SWITCHED. Figures 29-3 and 29-4 show the menus for this selection.

29.2.3 Multidrop Operation

There are two menu selections specifically for multidrop testing, EMulate DROP and EMulate HOST. Figure 29-5 shows the configurations in which the 4600 can be connected in a multidrop network.

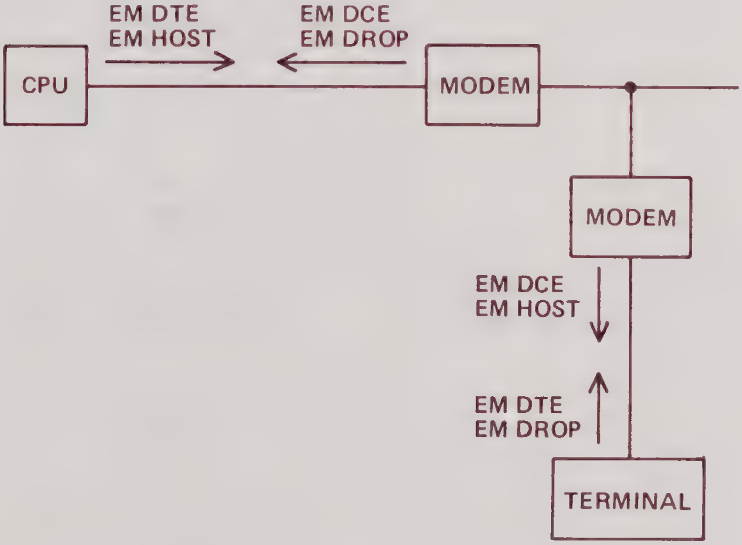
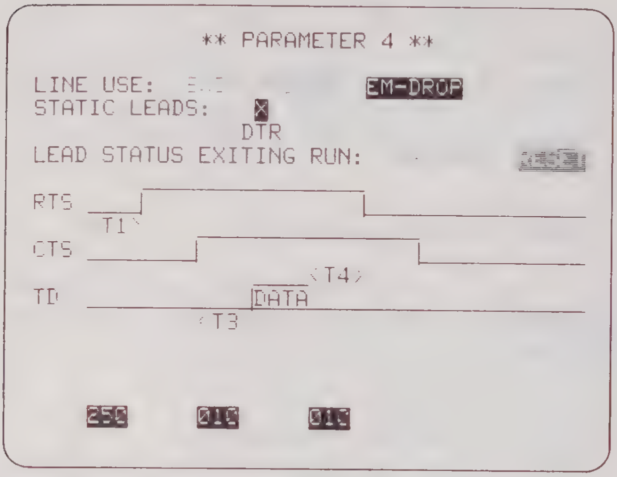
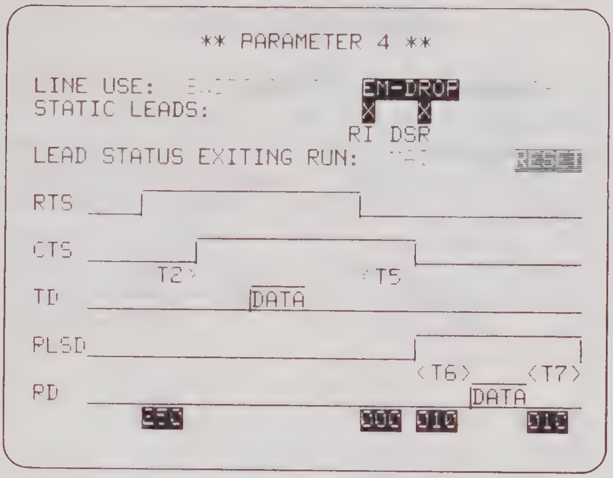


Figure 29-5 Connecting the 4600 in a multidrop system.



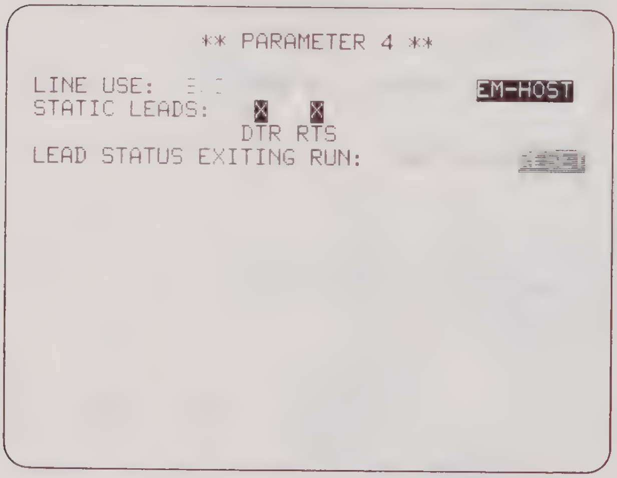
```
** PARAMETER 4 **

LINE USE:                    EM-DROP
STATIC LEADS:       X
                   DTR
LEAD STATUS EXITING RUN:                RESET
```

Figure 29-6 EM DROP, Em DTE Mode.



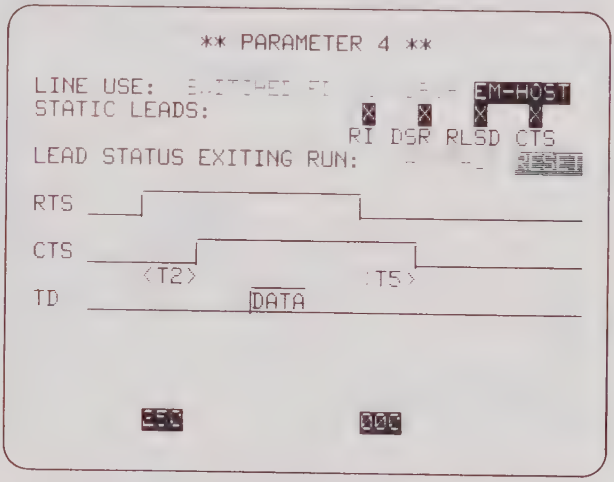
```
** PARAMETER 4 **

LINE USE:                    EM-DROP
STATIC LEADS:                X    X
                            RI  DSR
LEAD STATUS EXITING RUN:                RESET
```

Figure 29-7 EM DROP, Em DCE Mode.



```
** PARAMETER 4 **

LINE USE:                              EM-HOST
STATIC LEADS:       X    X
                   DTR  RTS
LEAD STATUS EXITING RUN:                RESET
```

Figure 29-8 EM HOST, Em DTE Mode.



```
** PARAMETER 4 **

LINE USE:                              EM-HOST
STATIC LEADS:                X    X    X    X
                            RI  DSR RLSD  CTS
LEAD STATUS EXITING RUN:                RESET
```

Figure 29-9 EM HOST, Em DCE Mode.

(a) Emulate Drop. When it is emulating a DTE, the INTERVIEW behaves as though it were in a Switched network (Figure 29-6). The 4600 turns RTS on, and waits for CTS before transmitting data. The delay between CTS coming high and data transmission is selectable.

When the INTERVIEW is emulating a DCE, it switches CTS and RLSD (Figure 29-7). You may select the RTS-CTS delays, and the delay between RLSD high and data transmission.

(b) Emulate Host. When it is emulating a DTE, the INTERVIEW transmits as though in a full-duplex network (Figure 29-8). RTS is a static lead (normally high).

When it is emulating a DCE, the 4600 switches CTS, and the RTS-CTS delays can be selected on the menu (Figure 29-9).

29.3 STATIC LEADS

In this field, you will be presented with several RS-232/V.24 lead choices depending on your prior selections (see Table 29-2). The static leads are not dynamically controlled in Run Mode: they are set to the prescribed state when the 4600 enters Run Mode, and will be maintained in that state.

When the entry in a STATIC LEADS data-entry box is X (Don't Care), the 4600 will maintain the lead at the OFF voltage. A 0 (zero) in the data-entry box also means OFF voltage level. In FDX mode, there is one case in which the distinction between DC and 0 is significant (see Section 29.6.1a).

Enter a 1 (one) in the box for any lead that you want to turn ON.

TABLE 29-2

PARAMETERS 4 MENU SELECTIONS

Mode	Static Leads	Leads Controlled by INTERVIEW	Leads Monitored by INTERVIEW	Selectable Delays
FDX				
EM DTE (Figure 29-1)	DTR, RTS	(None)	(None)	(None)
EM DCE (Figure 29-2)	RI, DSR, RLSD, CTS	CTS	RTS, TD	T2, T5
SWITCHED				
EM DTE (Figure 29-3)	DTR	RTS, TD	CTS	T1, T3, T4
EM DCE (Figure 29-4)	RI, DSR	CTS, RLSD, RD	RTS, TD	T2, T5, T6, T7
EM DROP				
EM DTE (Figure 29-6)	DTR	RTS,TD	CTS	T1, T3, T4
EM DCE (Figure 29-7)	RI, DSR	CTS, RLSD, RD	RTS, TD	T2, T5, T6, T7
EM HOST				
EM DTE (Figure 29-8)	DTR, RTS	(None)	(None)	(None)
EM DCE (Figure 29-9)	RI, DSR, RLSD, CTS	CTS	RTS, TD	T2, T5

29.4 LEAD STATUS EXITING RUN

(a) Reset. If you select RESET, then each time the 4600 leaves Run Mode, all active interface leads will be reset to the OFF voltage state and remain that way until the unit enters Run Mode again. The trigger program will also be reset.

(b) Maintain. MAINTAIN allows you to preserve data communications parameters even though the INTERVIEW has exited Run Mode. Selecting MAINTAIN has five specific effects:

- The active static leads of the RS-232/V.24 interface controlled by the 4600 maintain their voltage levels, even though the 4600 is in Program Mode.
- The status of the eight internal Trigger flags is stored. This allows you to interrupt a test by pressing the PROGRAM key, make changes in the test procedure, and then resume the test from wherever it was interrupted.
- The current values of N(S) and N(R) are stored. When the unit reenters Run Mode, transmission continues from the last values of N(S) and N(R) (see Section 35).
- The current values of P(S) and P(R) for six LCNs are stored (see Section 35). When the unit reenters Run Mode, transmission continues from the last values of P(S) and P(R).
- The value of the Transmit Variable (see Section 30) is stored. When the INTERVIEW resumes transmitting in Run Mode, it will increment the Transmit Variable from the last value sent.

29.5 DELAY TIME SELECTION

The graphic shown in the figures is displayed for all interface control modes except EM DTE, FDX. Under each delay time choice allowed by your prior selections (see Table 29-2), there will be a data-entry field.

The seven delay time fields, T1 through T7, are defined in Table 29-3. The maximum time that you may enter in a delay time entry field is 999 milliseconds. When you position the cursor on a delay time field, the 4600 displays the appropriate definition at the bottom of the screen.

29.6 OPERATION IN THE VARIOUS INTERFACE CONTROL MODES

29.6.1 Full Duplex

(a) CTS Control. FDX, EM DCE is the one case in which there is a distinction between Don't Care (DC) and OFF (0) in the Static Leads field. If the entry for CTS in the Static Leads field is DC, then when the terminal turns RTS on the 4600 will respond with CTS. If you want the 4600 to keep CTS OFF, enter a 0 in the CTS data-entry box; if you want CTS to be continuously ON, enter a 1. Thus if a 0 or 1 is entered in the Static Leads field for CTS, it will not follow RTS after the prescribed delay T2; and when the terminal turns RTS off the 4600 will wait time T4 and turn off CTS.

(b) 7E Framing. For 7E/X.25 and the two SDLC formats, in FDX mode one of the data leads idles with flags in Program Mode: For EM DTE, TD idles with 7E (hex) flags; for EM DCE, RD idles with flags.

29.6.2 Switched

(a) Emulate DTE. When a trigger comes true to transmit, the 4600 will wait until RLSD is OFF and then start timeout T1. If RLSD is off when the trigger comes true then timeout T1 is started immediately. After T1 milliseconds the 4600 will turn on RTS; it will then wait for CTS. When CTS goes on timeout T3 will start. After T3 milliseconds the 4600 will begin to transmit the message. After the last character has been transmitted timeout T4 will start. After T4 milliseconds the 4600 will turn off RTS and then wait for CTS to go off. At this point the 4600 considers the transmission complete.

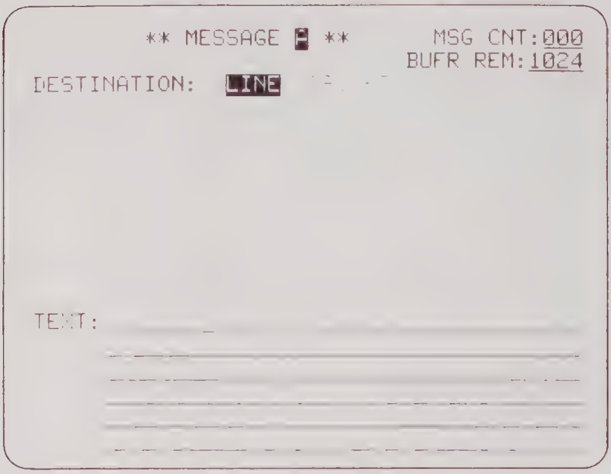
(b) Emulate DCE. When a trigger comes true to transmit, the 4600 will wait until CTS is off; then turn on RLSD. If CTS is already off, RLSD will be turned on immediately, and timeout T6 will then begin. After T6 milliseconds, the 4600 will begin to transmit the message. After the last character of the message has been transmitted, timeout T7 will start. After T7 milliseconds the 4600 will turn off RLSD. At this point the 4600 considers transmission complete.

The 4600 also monitors RTS. When RTS goes on, timeout T2 starts. After T2 milliseconds the 4600 turns CTS on; it then waits for RTS to go off. When RTS goes off, timeout T5 starts. After T5 milliseconds the 4600 will turn off CTS.

TABLE 29-3
DELAY TIME SELECTIONS

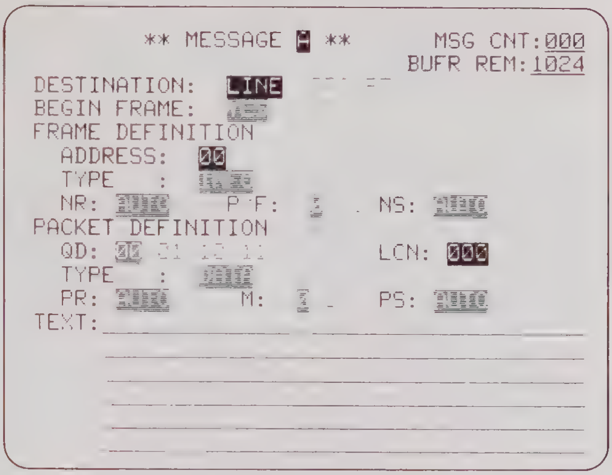
Field	Definition	Default Value (msec)
T1	Time from trigger true to RTS ON	250
T2	RTS ON to CTS ON	250
T3	CTS ON to Start Xmit	010
T4	End Xmit to RTS OFF	010
T5	RTS OFF to CTS OFF	000
T6	RLSD ON to Start Xmit	010
T7	End Xmit to RLSD OFF	010

30. MESSAGE CONTENT



```
          ** MESSAGE A **        MSG CNT:000
                                BUFR REM:1024
DESTINATION:  LINE








TEXT:
```

Figure 30-1



```
          ** MESSAGE A **        MSG CNT:000
                                BUFR REM:1024
DESTINATION:  LINE
BEGIN FRAME:  YES
FRAME DEFINITION
  ADDRESS: 00
  TYPE    : [illegible]
  NR: AUTO     P/F:  0      NS: AUTO
PACKET DEFINITION
  QD: 00 01 10 11           LCN: 000
  TYPE    : DATA
  PR: AUTO      M:  0       PS: AUTO
TEXT:
```

Figure 30-2

30
MESSAGE CONTENT

All message transmissions are controlled by triggers but the message content can be selected in several ways, in either Program or Run Mode:

(1) message-entry menus;
(2) keyboard buffer;
(3) receive buffer;
(4) factory-stored message;
(5) transmit variable.

30.1 MESSAGE-ENTRY MENUS

The 16 message-entry menus are used to enter message text in Program Mode. To select a message-entry menu, first press the MESSAGE key, which displays the Message Summary; then press the number (0 - F) of the menu you want.

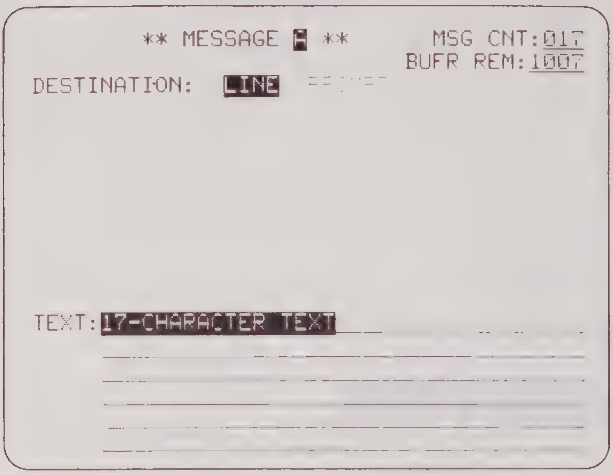
These menus are identical except for their identification numbers. Figure 30-1 shows a typical message-entry menu for BISYNC protocol; Figure 30-2, the menu as it appears when 7E/X.25 FORMAT has been selected (the special FRAME and PACKET DEFINITION selections are explained in Section 35). The message you type in is automatically entered in the message buffer, but you may alter it at any time by changing the Message-Entry menu.

To transmit the text and (or) protocol from a message-entry menu, enter the number of the menu (a hexadecimal number from 0 to F) in the Set Xmit field of a Trigger Actions menu (see Section 31 for complete instructions).

(a) Destination (Line 3). The default choice is LINE. When the trigger conditions become true, the protocol and (or) text entered will be transmitted on TD or RD, depending on the selection in the MODE field of the Parameters 1 menu.

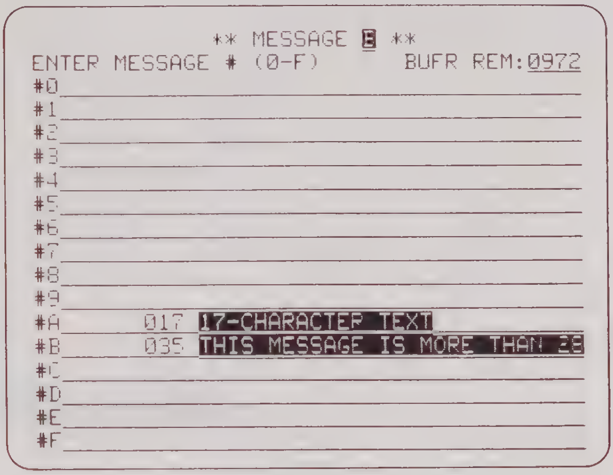
If PROMPT is selected, no message will be transmitted, but the Text entered will be displayed as a message to the operator on the second line of the Run Mode display (Prompts are explained in Section 19.2).

(b) Text (Lines 10 - 15). In this data-entry field you can type in a message to be transmitted or displayed as an operator prompt. The maximum length for a transmitted message is 210 characters. There are 16 message menus, but the total message buffer space is 1024 bytes, so if you enter a number of messages and prompts, not all of them can be of maximum length.



```
          ** MESSAGE A **            MSG CNT:017
                                   BUFR REM:1007
DESTINATION:  LINE





TEXT:17-CHARACTER TEXT
```

Figure 30-3



```
               ** MESSAGE B **
ENTER MESSAGE # (0-F)          BUFR REM:0972
#0
#1
#2
#3
#4
#5
#6
#7
#8
#9
#A         017  17-CHARACTER TEXT
#B         035  THIS MESSAGE IS MORE THAN 28
#C
#D
#E
#F
```

Figure 30-4

If you have selected PROMPT, only 40 characters can be displayed in Run Mode.

In the upper right-hand corner of the menu are always displayed the total number of message characters currently entered in the message buffer (MSG CNT) and the total message buffer (BUFR REM) currently remaining (Figure 30-3). Frame and Packet Definition selections are not counted.

All alphanumeric characters are valid in the Text field. Control characters may be used, but the FLAG key is invalid. Hexadecimal characters may be used in transmitted messages but should not be used in Prompts. If a message character is entered in hexadecimal it is not translated and parity is not calculated.

Press the MESSAGE key to return to the Message Summary and select another message-entry menu.

30.2 MESSAGE SUMMARY MENU

The Message Summary menu (see Figure 30-4) is your only entrance to the Message-Entry menus. While the Message Summary is displayed, you may enter any digit from 0 to F to obtain one of the 16 message-entry menus. (The HEX key is not needed.)

While a Message-Entry menu is displayed you may again view the Message Summary by pressing the MESSAGE key.

On Line 2, the Message Summary always displays the total message buffer space that is currently available (BUFfeR REMaining). For each Message-Entry menu, it tells you the number of characters in the message and also shows the first 28 characters of the message to remind you of what messages are currently in the buffer (see Figure 30-4).

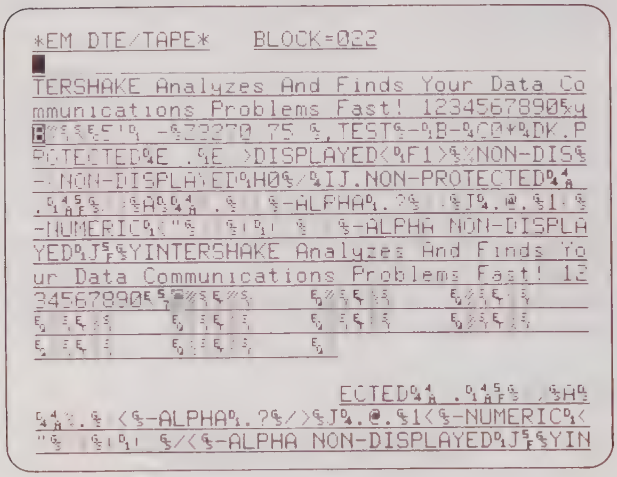
For SDLC protocols, each message summary line is preceded by the mnemonic for the frame type selected on the message-entry menu. For X.25 protocols, if INFO frame is selected on a message-entry menu the packet type will be displayed at the beginning of the message summary line; otherwise, the frame type will be shown.

30.3 MESSAGE FRAMING

(a) All six messages designated in the SET XMIT field of a trigger Actions menu (except, of course, for Prompts) are always transmitted as one sequence in the message envelope that you select on the Parameters 4 menu. To the 4600, one transmission always consists of all SET XMIT message entries on one trigger.

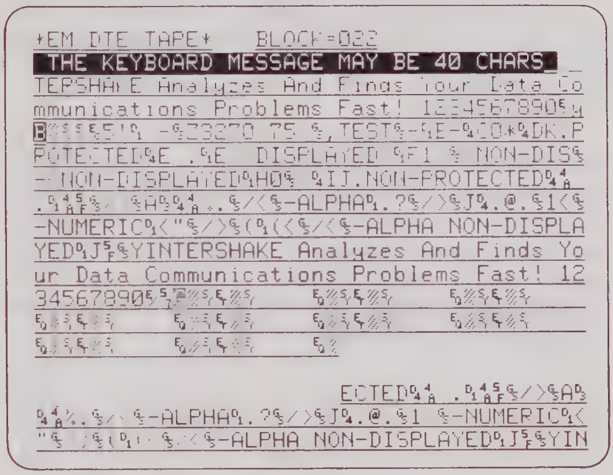
(b) For BSC/X.25 and 7E/X.25 there are special fields on the message-entry menus for both Frame and Packet Definition (see Section 35). For SDLC and SDLC/NRZI, the level 3 protocol bytes may be entered in the Text field.

(c) For other protocols, you can enter protocol characters with the message text; or you may use a separate Message-Entry menu to enter each header or trailer and use the message text from any other message-entry menu, the Receive Buffer, Keyboard Buffer, or factory-stored message. If you wish block check calculations to be performed and displayed, always select (1) BLOCK CHECK ON on the Parameters 1 menu (Section 14) and (2) GooD or BaD BCC on the SET XMIT line of the Trigger Actions menu (Section 31.1).



```
*EM DTE/TAPE*    BLOCK=022
█
TERSHAKE Analyzes And Finds Your Data Co
mmunications Problems Fast! 1234567890§y
B§§§5!§ -§Z3270 75 §,TEST§-§B-§C0*§DK.P
ROTECTED§E .§E >DISPLAYED<§F1>§%NON-DIS§
-·NON-DISPLAYED§H0§/§IJ.NON-PROTECTED§
.§§ §A§§ .§ §-ALPHA§.?§ §J§.@.§1 §
-NUMERIC§"§ §§ § §-ALPHA NON-DISPLA
YED§J§§YINTERSHAKE Analyzes And Finds Yo
ur Data Communications Problems Fast! 12
34567890§§§§§§ §§§§ §§§§
§§§§ §§§§ §§§§ §§§§
§§§§ §§§§ §

                         ECTED§ .§§ ,§A§
§§.§ <§-ALPHA§.?§/>§J§.@.§1<§-NUMERIC§<
"§ §§ §/<§-ALPHA NON-DISPLAYED§J§§YIN
```

Figure 30-5



```
*EM DTE TAPE*    BLOCK=022
 THE KEYBOARD MESSAGE MAY BE 40 CHARS_ _
TERSHAKE Analyzes And Finds Your Data Co
mmunications Problems Fast! 1234567890§y
B§§§5!§ -§Z3270 75 §,TEST§-§E-§C0*§DK.P
ROTECTED§E .§E  DISPLAYED §F1 § NON-DIS§
-·NON-DISPLAYED§H0§ §IJ.NON-PROTECTED§
.§§ §A§§..§/<§-ALPHA§.?§/>§J§.@.§1<§
-NUMERIC§<"§/>§(§(<§/<§-ALPHA NON-DISPLA
YED§J§§YINTERSHAKE Analyzes And Finds Yo
ur Data Communications Problems Fast! 12
34567890§§§§§§ §§§§ §§§§
§§§§ §§§§ §§§§ §§§§
§§§§ §§§§ §

                         ECTED§ .§§/>§A§
§§.§/ §-ALPHA§.?§/>§J§.@.§1 §-NUMERIC§<
"§ ;§(§ §/<§-ALPHA NON-DISPLAYED§J§§YIN
```

Figure 30-6

30.4 KEYBOARD BUFFER MESSAGES

You may type message text into the 4600's Keyboard Buffer in Run Mode, while either data or frame or packet protocol is displayed. Manual freeze cannot be on and neither Program Summary nor Results can be displayed. The Keyboard Buffer holds 40 characters. Its content must be transferred to a Transmit Buffer before it can be transmitted. Like other messages, the Keyboard Transmit Buffer content is transmitted by triggers (see Section 31.1) but you may obtain manual control of the triggers (see Section 31.2). The procedure is as follows:

(1) First enter K, for Keyboard, in the message space on the SET XMIT line of a Trigger Actions menu. Protocol bytes may be transmitted by using message-entry menus and entering the menu numbers here; or the protocol may be entered in the keyboard buffer as part of the text.

(2) While data is displayed -- but not manually frozen -- press the MESSAGE key. The second line of the display will clear (see Figure 30-5). Type in a message of up to 40 characters. All alphanumeric, hexadecimal, and control characters are legal. The Flag key may not be used. As you type the message, it will be displayed on Line 2 (Figure 30-6). CLEAR FIELD clears the Keyboard Buffer. Just as on the program menus, you can use cursor arrows, CONTROL plus a cursor arrow, or SHIFT-CLEAR FIELD to make changes in this field.

(3) The Keyboard Buffer message must be transferred to the Keyboard Transmit Buffer. If the keyboard message is not transferred before the trigger acts, it will not be sent. There are two ways to transfer the keyboard message to the Keyboard Transmit Buffer:

- Press the MESSAGE key again. The Keyboard Buffer will be cleared and closed to keyboard access and Line 2 of the display will again display status information. Each time the trigger conditions come true, the message will be transmitted.

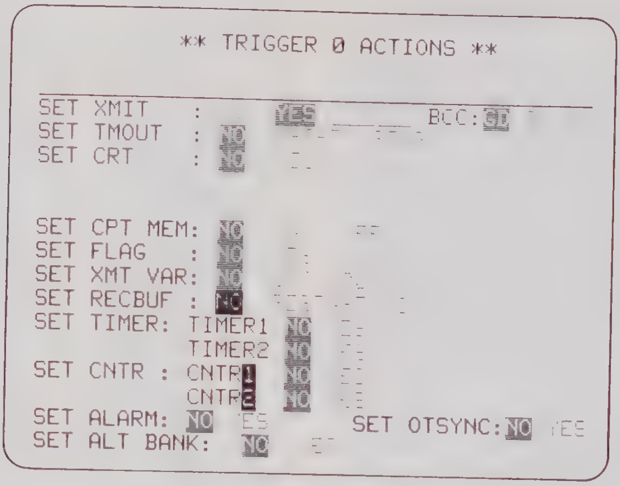
- Press the ENTER key. The message will be transferred to the Keyboard Transmit Buffer but the entry field on Line 2 will remain and you may enter another message in the Keyboard Buffer. Meanwhile, each time the trigger conditions are true the message already in the Transmit Buffer will be sent.

(4) To clear the Transmit Buffer, press CONTROL-CLEAR FIELD while the Keyboard Buffer entry field is displayed. This also clears the Keyboard Buffer.

CAUTION: Be sure to transfer your message to the Keyboard Transmit Buffer before you change the display by pressing MANUAL FREEZE, PROGRAM SUMMARY, or RESULTS. In these cases, you will (1) lose the contents of the Keyboard Buffer, and (2) lose access to the Keyboard Buffer. A message already in the Transmit Buffer will not be affected. HALT, CLEAR CRT, or SELF TEST will not affect either the Keyboard Buffer or the Transmit Buffer.

30.5 RECEIVE BUFFER; ECHO

The Receive Buffer can be loaded with up to 255 bytes of received data which can then be transmitted by entering an R in the Set Xmit field of a Trigger Actions menu.



```
             ** TRIGGER 0 ACTIONS **

SET XMIT    :     YES              BCC:
SET TMOUT   : NO
SET CRT     : NO


SET CPT MEM: NO
SET FLAG    : NO
SET XMT VAR: NO
SET RECBUF  : NO
SET TIMER: TIMER1  NO
           TIMER2  NO
SET CNTR  : CNTR1  NO
            CNTR2  NO
SET ALARM: NO  ES          SET OTSYNC:NO  ES
SET ALT BANK:  NO
```

Figure 30-7

To load the Receive Buffer, use the SET RECBUF selection field on the Trigger Actions menu (see Figure 30-7). RESTART clears the buffer and starts loading it with received data; STOP causes the buffer to stop loading. The default choice is NO.

In EM DTE mode, the Receive Buffer loads from the RD line; in EM DCE mode, it loads from the TD line. Data transmitted by the 4600 cannot be loaded into the Receive Buffer.

The Receive Buffer generally should be used in a controlled test to ensure that only the data in which you are interested satisfies the conditions for loading the buffer.

> NOTE: Triggers should not be set to load more than 255 bytes in the Receive Buffer. If you attempt to load more than 255 bytes in the buffer, only modulo 256 characters will be kept in the buffer; for example, if you try to load 258 bytes, only the last two will be kept.

To transmit the Receive Buffer contents, enter an R on the SET XMIT line of a Trigger Actions menu (see Section 31.1 for complete instructions). Normally, header and trailer information must be sent along with the Receive Buffer. For instance, you might enter the messages 0, R, and 1 in the SET XMIT field, where 0 is SY SY SY STX and 1 is ETX. Then the text of the message would be the Receive Buffer contents.

> NOTE: If you set a trigger to send the Receive Buffer while it is being loaded (after it has been RESTARTed but before it has been STOPped), nothing will be sent.

30.6 FACTORY-STORED MESSAGE

To transmit the 4600's factory-stored message, enter an M on the SET XMIT line of a Trigger Actions menu (see Section 31.1). As with the Receive Buffer, the leading and trailing protocol characters must be added using the Message-Entry menus. The text of the stored message is as follows:

For unshifted code (54 characters):

```
THE QUICK BROWN FOX JUMPS OVER THE LAZY
DOG 0123456789
```

For upper/lower case shifted code (56 characters):

```
\THE QUICK BROWN FOX JUMPS OVER THE LAZY
DOG 0123456789
```

For letters/figures shifted code (56 characters):

```
THE QUICK BROWN FOX JUMPS OVER THE LAZY
DOG \0123456789
```

30.7 TRANSMIT VARIABLE

The 4600 has a Variable Counter that is controlled by the trigger Set Xmt Var action (Figure 30-7). Its 1-byte output can be included in any transmission by the 4600. This counter may be set or incremented on the same trigger as the transmission in which it is to be included. The default selection is NO.

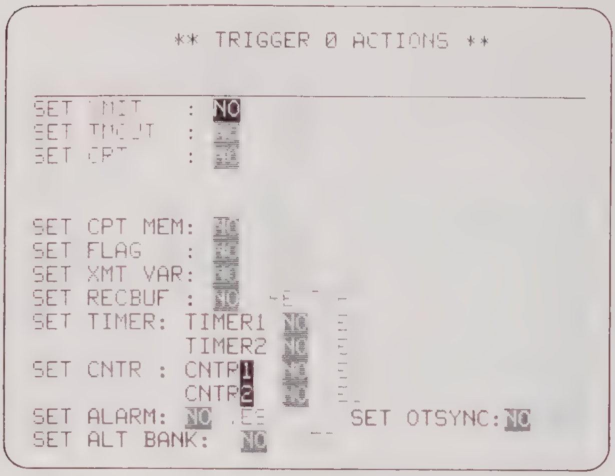
> NOTE: The Transmit Variable will not be adjusted for parity or for inverted or reversed data signals. You can adjust your hexadecimal SET entry for these characteristics, but INCrement will ignore them.

(a) Increment. To increment the Transmit Variable Counter by 1, select INC.

(b) Set and Reset (Data-Entry Field). To set the Transmit Variable Counter, move the cursor into the data-entry field to the right of the INC selection. Enter a two-digit hexadecimal number (the HEX key need not be used here). To reset the Transmit Variable Counter, enter 00 in the data-entry field.

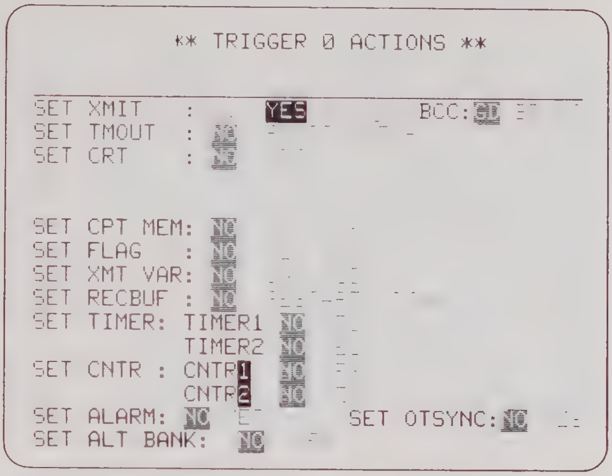
(c) INC and XMIT on the Same Trigger. If the same trigger is used to increment the Variable Counter and to send the Variable Counter in a message, then the counter will increment once before it is sent. Thus -- when the INC and XMIT actions are taken by the same trigger -- if the value of the counter is 00 (hex) when the trigger comes true, the transmitted count will begin with 01. If you want the transmitted count to begin with 00, set the counter to FF on another trigger, so the counter will increment to 00 before transmission.

31. TRANSMISSION CONTROL



```
             ** TRIGGER 0 ACTIONS **

SET XMIT    : NO
SET TMOUT   : NO
SET CRT     : NO


SET CPT MEM: NO
SET FLAG    : NO
SET XMT VAR: NO
SET RECBUF  : NO
SET TIMER: TIMER1  NO
           TIMER2  NO
SET CNTR  : CNTR1  NO
            CNTR2  NO
SET ALARM: NO           SET OTSYNC:NO
SET ALT BANK:  NO
```

Figure 31-1



```
             ** TRIGGER 0 ACTIONS **

SET XMIT    :     YES           BCC:GD
SET TMOUT   : NO
SET CRT     : NO


SET CPT MEM: NO
SET FLAG    : NO
SET XMT VAR: NO
SET RECBUF  : NO
SET TIMER: TIMER1  NO
           TIMER2  NO
SET CNTR  : CNTR1  NO
            CNTR2  NO
SET ALARM: NO           SET OTSYNC:NO
SET ALT BANK:  NO
```

Figure 31-2

31
TRANSMISSION CONTROL

The 4600's transmissions are always under trigger control. The Set Xmit line of the Trigger Actions menus must be used to transmit all messages. You can control the trigger action manually, however, by means of the Marker condition.

31.1 TRIGGER TRANSMIT ACTION

Set Xmit is the first field on the Trigger Actions menus (see Figure 31-1). When one of the Emulate Modes has been chosen on the Parameters 1 menu, you will use the Set Xmit action to designate which messages you want the trigger to send. You may also include one Prompt (see Section 19.2) in the message list. The default selection is NO.

(a) Message Designation. When YES is selected (see Figure 31-2), two more fields appear on the Set Xmit line. The first is a data-entry field allowing six characters. In this field you may enter the identification characters for up to six messages in the order that they are to be sent. When the trigger conditions come true, the RS-232/V.24 leads will be controlled in accordance with the message transmission envelope selected on the Parameters 4 menu (see Section 29), and the messages will be sent in the order in which they appear in the Set Xmit field. If a Prompt is included in the message list, it will be displayed immediately when the trigger is true, no matter what its position in the list.

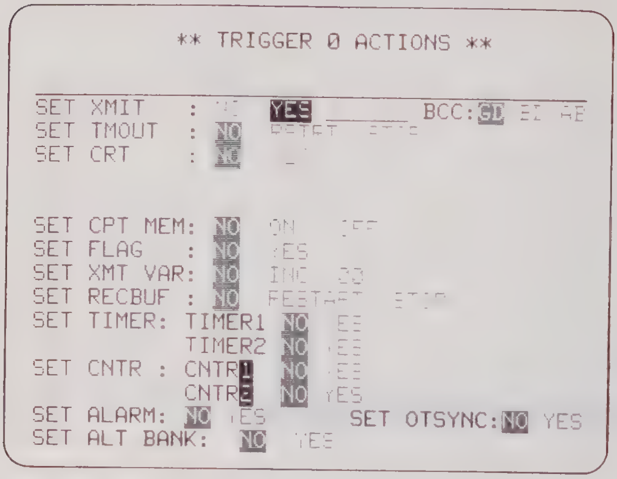
You may transmit up to six of the 16 messages (0 - F) you may have entered on the Message-Entry menus (see Section 30.1) by simply entering their hexadecimal identification numbers (0 - F) in the order you wish them to be sent.

To transmit the contents of the Receive Buffer (see Section 30.5), enter an R.

If you want to enter a message from the keyboard in Run Mode (see Section 30.4), enter a K.

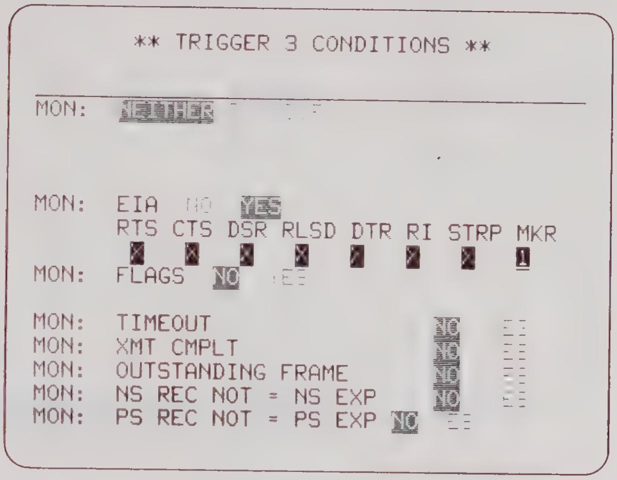
To send the 4600's standard stored message (see Section 30.6), enter an M. The stored message will automatically be sent.

To send a 1-byte variable that is be incremented or set by triggers (see Section 35.10), enter a V.



```
              ** TRIGGER 0 ACTIONS **

SET XMIT    : NO   YES  ______   BCC:GD BD AB
SET TMOUT   : NO   RESTRT  STOP
SET CRT     : NO   _


SET CPT MEM: NO   ON    OFF
SET FLAG    : NO   YES
SET XMT VAR: NO   INC  DEC
SET RECBUF  : NO   RESTART   STOP
SET TIMER: TIMER1  NO  YES
           TIMER2  NO  YES
SET CNTR  : CNTR1  NO  YES
            CNTR2  NO  YES
SET ALARM: NO  YES         SET OTSYNC:NO YES
SET ALT BANK:  NO  YES
```

Figure 31-3



```
           ** TRIGGER 3 CONDITIONS **

MON:   NEITHER


MON:   EIA  NO  YES
       RTS CTS DSR RLSD DTR RI STRP MKR
        X   X   X   X    X   X   X   1
MON:   FLAGS  NO  YES

MON:   TIMEOUT                     NO   YES
MON:   XMT CMPLT                   NO   YES
MON:   OUTSTANDING FRAME           NO   YES
MON:   NS REC NOT = NS EXP         NO   YES
MON:   PS REC NOT = PS EXP NO  YES
```

Figure 31-4

(b) Transmitted Block Check. The third field on this line enables you to send either a GooD or a BaD BCC. The default selection is GD. The 4600 will make the proper calculation for your Parameters 1 menu selections and send either a good or bad BCC, respectively, for each end-of-block character sequence detected in any of the messages entered in the preceding field. If there is a PROMPT included in the message list, it will be ignored when the block check is calculated.

> NOTE: No matter how many messages are entered in the Set Xmit field, the number of blocks is determined by the number of end-of-block sequences detected, with a maximum of one BCC calculation per message. For correct operation, the end-of-block sequence must be placed at the end of a message.

If received Block Check is ON in the unit (Parameters 1 menu; see Section 14), the second block check character transmitted will be replaced by G or B on the display; if received Block Check is not on, you will see both block check characters as they are actually transmitted.

For 7E/X.25, SDLC, or SDLC/NRZI, the bad BCC will be CRC-16 instead of CCITT; for other formats it will be an inverted good BCC.

If you select NO, then no block check character will be sent.

For 7E/X.25, SDLC, and SDLC/NRZI, the NO selection is replaced by AB (see Figure 31-3). You may send an abort by selecting AB whether or not you have designated any messages to be sent. If you have designated any messages to be sent, the transmission will be aborted.

(c) Message Transmission Priorities. When a Transmit action comes true, the action is put into a 16-action buffer. The transmit actions are then taken in the order in which they entered the buffer. Thus, if triggers come true in the order 1, 5, and 2, the blocks will be sent in that order.

Message blocks transmitted by separate triggers will be transmitted separately with at least one fill character (or 7E flag) between blocks. In Switched, Em Drop, or Em Host Mode (Section 29), the interface leads will be controlled between blocks. If more than 16 Transmit actions are stacked, an error message will be displayed. Once the error message is displayed, the PROGRAM key must be pressed to reset the error.

31.2 MANUAL TRANSMISSIONS

Although all transmissions are trigger actions in the INTERVIEW 4600, you can control the triggers manually. Simply have a trigger look for the MARKER; that is, select MON EIA:YES and enter a 1 (or 0) in the MKR field on the Conditions menu (see Figure 31-4). Then designate the message or messages to be sent in the Set Xmit field of the Actions menu.

Whenever the ENTER key is pressed (or released, if 0 is selected) in Run Mode, the trigger will be true and the message will be sent.

The keyboard buffer is especially useful for sending messages in this manner. (See Section 30.4 for a complete discussion of the Keyboard Buffer.)

31.3 SENDING THE RECEIVE BUFFER

The 4600 has a Receive Buffer (see Section 30.5) which can be loaded by triggers with data from the receive side of the line. The Receive Buffer can hold up to 255 characters, which can then be transmitted by the 4600.

To load the Receive Buffer, follow the instructions in Section 30.5; to send the Receive Buffer, enter an R in the Set Xmit field of a Trigger Actions menu.

It is usually necessary to enter header and trailer information on message-entry menus; then frame the R entry in the Set Xmit field with the numbers of these message-entry menus.

If a trigger tries to send the Receive Buffer while it is being loaded nothing will be sent.

31.4 TRANSMISSION COMPLETE CONDITION

The XMT CMPLT field appears on Line 14 of the Trigger Conditions menus only if you have selected one of the Emulate Modes on the Parameters 1 menu. The default choice is OFF. When YES is selected the trigger looks for the end of a transmission by the 4600. The XMIT CMPLT condition usually should be used with another condition to control when, or how many times, it will be tested.

A transmission is defined as all messages (excluding Prompts) entered in the SET XMIT field of a Trigger. In full-duplex operation, End of Transmission usually is the last character in the last message entered in the SET XMIT field if Block Check (Parameters 1) is not on, or the second Block Check Character if Block Check is on. However, in Switched carrier, Em Drop, and Em Host modes (Parameters 4; Section 29) a transmission is not considered complete until all of the interface handshaking is complete.

31.5 LOOPBACK

The INTERVIEW 4600's ability to transmit to itself can be put to good use for training purposes. The procedure is as follows:

(1) Be sure that no data lines are connected at the rear of the unit.

(2) When you select Emulate DCE Mode, INT CLOCK will be selected automatically. For EM DTE, be sure to select INT CLOCK.

(3) Select LINE as the SOURCE. Choose the appropriate code and format.

(4) The default Parameters 4 menu is acceptable for this purpose because there will be no switched leads to serve as references for delay times.

(5) Remember that all transmissions are under trigger control, so you must set triggers to transmit. There is no incoming data to trigger on, but you can use internal flags as the Trigger source to start the transmission. Since the initial flag status is always all 0's, you can use Flag OFF as the condition to start transmission. Enter a zero for a flag on a Conditions menu; then set the trigger to transmit your message and turn that flag on. This starts transmission, which provides you with other possible trigger sources (End of Transmission or a DCE string, for example) for further transmissions.

NOTE: The Receive Buffer cannot be used as it will not load data from the Transmit side of the line.

The display will show the 4600's transmissions as they are received from the line. If the 4600 is in EM DTE mode, you will see TD data (Pin 2); in EM DCE mode, you will see RD (Pin 3) data. The block check characters you see will be the transmitted characters. If Received Block Check is ON, the second block check character will be replaced by G or B because the 4600 is receiving and checking its own transmissions.

32

HIGH-SPEED OPERATION

32.1 SELECTING HIGH-SPEED OPERATION

High-Speed Monitor is selected in the MODE field of the Parameters 1 menu. It is intended for use with the High-Speed Memory (RAM) at line data speeds above 19.2 kbps and up to 72 kbps. It should not be used for tape or RAM playback.

> *CAUTION: Do not attempt to record on tape at data speeds above 19.2 kbps. The tape will not record properly and it may run off the reel; or the INTERVIEW may lock up. In the latter case, the only way to regain control of the unit may be to turn it off and then on again.*

Always choose SINGLE-line display on the Parameters 2 menu. Dual-line display may not maintain time correlation between TD and RD at speeds above 19.2 kbps.

32.2 BLOCK CHECK CALCULATIONS

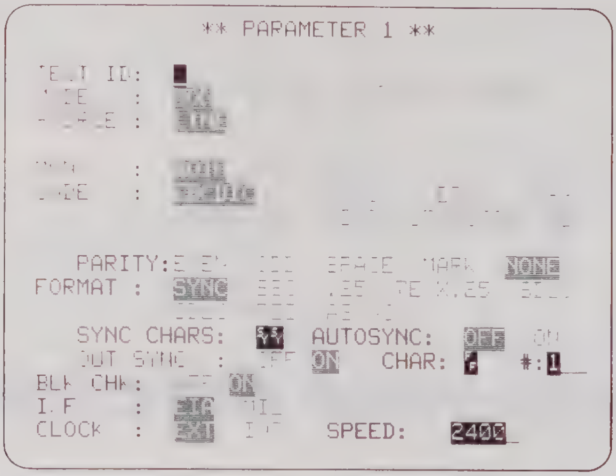
Received block check is always on for 7E-framed bit-oriented protocols, but no flags will be displayed. No received block checks are done for other formats.

32.3 TRIGGER USE

Up to 72 kbps, two triggers are available in each bank.

The only Trigger Conditions that are valid are MON:DTE and MON:DCE for either STRG or 1 OF (Lines 4-6 of the Conditions menu). If STRG is selected and a string of more than eight characters is used, then only one trigger is available in that bank. Triggers should not be linked.

Two Trigger Actions are valid in High-Speed Monitor Mode, namely, SET CPT MEM and SET ALT BANK. These actions function in the same way as in other modes.



```
                ** PARAMETER 1 **

TEST ID:

   PARITY:EVEN  ODD  SPACE  MARK  NONE
FORMAT :  SYNC   BSC  X.25  TE X.25  SDLC

   SYNC CHARS:  SY  AUTOSYNC:  OFF   ON
   OUT SYNC  :  OFF  ON    CHAR:     #:1
BLK CHK:  OFF  ON
I.F     :
CLOCK   :  EXT   INT   SPEED:    2400
```

Figure 33-1

33

BIT-ORIENTED PROTOCOLS: GENERAL INFORMATION

Sections 33 through 35 bring together special information needed to use the INTERVIEW in systems with bit-oriented protocols. This section contains general background material. The 4600 has a number of special display features designed especially for these protocols, and these are discussed in Section 34. For instructions on transmitting bit-oriented protocols, please see Section 35.

33.1 FORMAT SELECTIONS (PARAMETERS 1 MENU)

There are three basic selections for HDLC-framed protocols in the Parameters 1 FORMAT field (see Figure 33-1): 7E/X.25; SDLC; and SDLC/NRZI. In addition, BISYNC framing can be obtained by selecting BSC/X.25.

No matter which format you intend to use, select the correct CODE for your data and, if applicable, the number of information BITS and PARITY also.

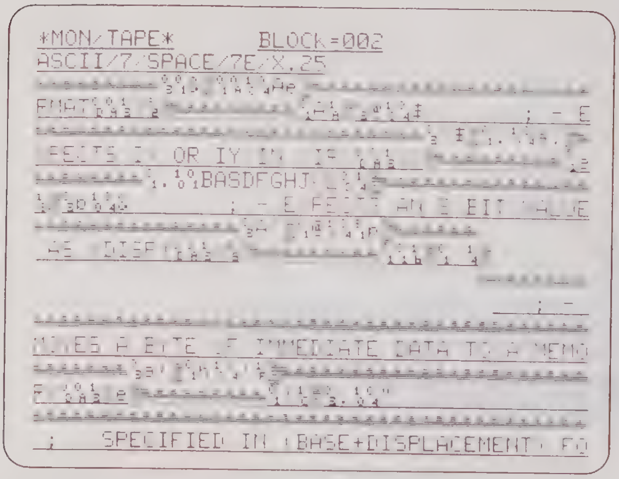
(a) HDLC Framing. For 7E/X.25 and SDLC or SDLC/NRZI, framing is determined automatically by the Format selection.

(b) BISYNC Framing. For BSC/X.25, the synchronization characters default according to the code selected but you may enter any synchronization characters by writing over the SY SY in the SYNC CHARS field. OUTSYNC should be changed to at least two FFs (hex), because if the 4600 goes out of synchronization on an FF (hex) in the frame check sequence, it may confuse the automatic frame or packet locator.

33.2 FRAME- AND PACKET-LEVEL MNEMONICS

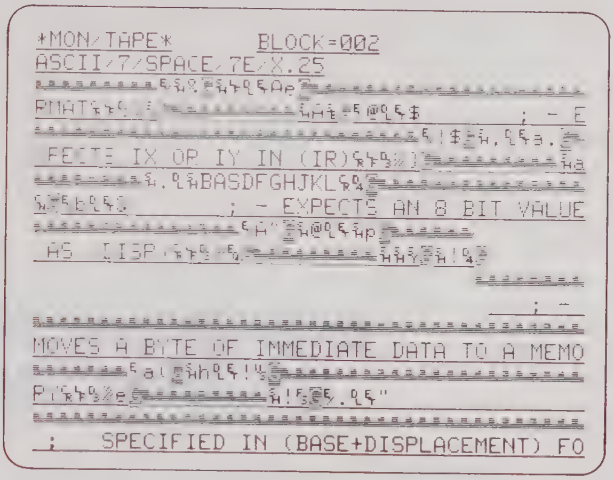
For both X.25 and SDLC-SNA, the 4600 will analyze and transmit frame-level protocol. For X.25, it can also analyze and transmit packet-level protocol.

Table 34-1 lists the frame-level mnemonics that the 4600 will display. The X.25 set includes LAP B and also applies to X.75. Table 34-2 gives the packet-level mnemonics that are available for 7E/X.25 and BSC/X.25.



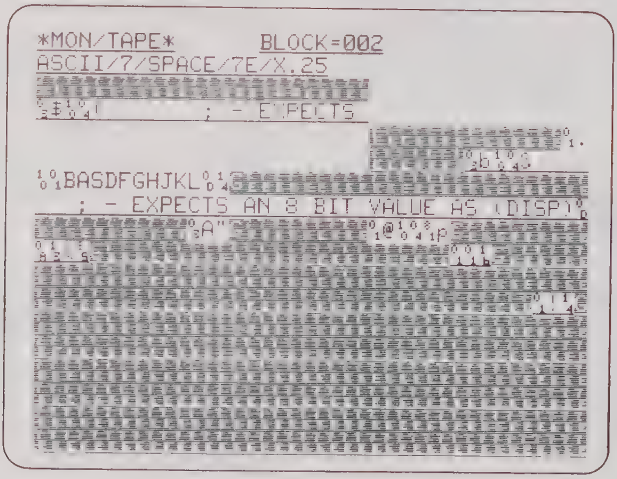
```
*MON/TAPE*        BLOCK=002
ASCII/7/SPACE/7E/X.25
                                    ; - E
                                   ; - E
                                        ; -
; SPECIFIED IN (BASE+DISPLACEMENT) FO
```

Figure 33-2 Dual-line display, CONTROL-HEX on.



```
*MON/TAPE*        BLOCK=002
ASCII/7/SPACE/7E/X.25
                                         ; - E
 FECTE IX OR IY IN (IR)
BASDFGHJKL
                ; - EXPECTS AN 8 BIT VALUE
                                           ; -
MOVES A BYTE OF IMMEDIATE DATA TO A MEMO
; SPECIFIED IN (BASE+DISPLACEMENT) FO
```

Figure 33-3 Dual-line display, CONTROL-HEX off, flags suppressed.



```
*MON/TAPE*        BLOCK=002
ASCII/7/SPACE/7E/X.25
               ; - EXPECTS
BASDFGHJKL
    ; - EXPECTS AN 8 BIT VALUE AS (DISP)
```

Figure 33-4 HDLC display when flags are not suppressed.

33.3 DISPLAY CONTROL

(a) Dual-Line Display. The DUAL selection for DISPLAY MODE on the Parameters 2 menu is useful for displaying full-duplex data. It selects dual-line display with L-shaped fill symbols inserted in the data to maintain time correlation between TD and RD (see Figure 33-2).

(b) Hexadecimal Display. For BSC/X.25, 7E/X.25, SDLC, and SDLC/NRZI, CONTROL-HEX is on when the INTERVIEW enters Run Mode (Figure 33-2). All control characters for the data code selected on Parameters 1 are displayed in hexadecimal. You may alternately override this to see the mnemonics for these characters by repeating CONTROL-HEX (Figure 33-3). The HEX key alone will alternately display all data in hexadecimal just as it does for other formats.

33.4 HDLC FLAGS (7E, hex)

(a) Display. In both Program and Run Mode, 7E (hex) flag bytes are always displayed in low-intensity reverse image (Figure 33-4) to distinguish them from transparent data 7E (hex).

(b) Program Entries. To enter the flag byte on a program menu always use, simultaneously, the CONTROL key plus the special FLAG key at the right of the alphanumeric key area. The flag will appear on the menu as a low-intensity 7E (hex).

> NOTE: The 4600's logic will not read the key sequence HEX 7 E as a flag.

(c) Suppressing Display of Flags. Idle flags may be suppressed from the display by entering CONTROL-FLAG in the SUPPRESS field on the Parameters 2 menu (compare Figures 33-3 and 33-4).

33.5 BLOCK CHECK CALCULATIONS FOR HDLC FRAMING

The INTERVIEW 4600 will do block check calculations on both received and transmitted data.

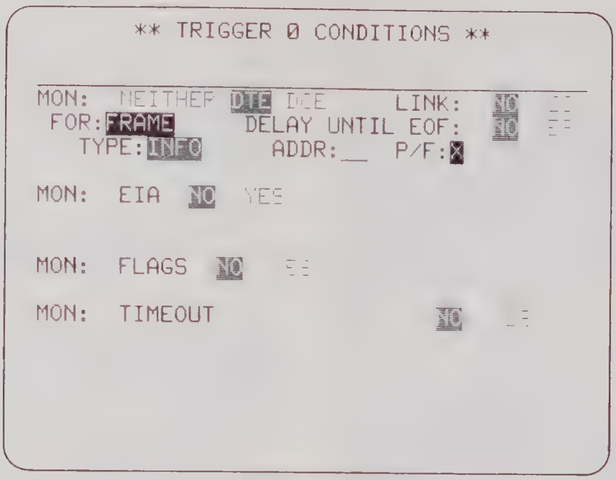
For 7E/X.25, SDLC, and SDLC/NRZI, Received Block Check is always ON in the 4600 and the BLOCK CHECK selection is absent from the Parameters 1 menu. On the data display, the second frame check byte (FCS) is replaced by a low-intensity, reverse-image G for a Good block check or by a bright reverse-image B for a Bad block check. Aborted frames are identified by a bright reverse-image A.

You may transmit messages with either good or bad BCCs and you may also transmit aborts. The transmitted block check is chosen in the Set Xmit field of a Trigger Actions menu (see Section 31.1).

The block check polynomial is CRC-CCITT, X16 + X12 + X5 + 1. The block check starts with the address byte and stops at the end of the frame check sequence. Inserted zeros are ignored. No block check is calculated following seven consecutive 1's (aborted frame).

33.6 BLOCK CHECK CALCULATIONS FOR BISYNC FRAMING

For the Parameters 1 selection BSC/X.25, or BISYNC-framed HDLC, the software defaults to Received Block Check ON, but you may select OFF on the Parameters 1 menu.



```
              ** TRIGGER 0 CONDITIONS **

MON:   NEITHER DTE DCE       LINK:     NO   YES
 FOR:FRAME       DELAY UNTIL EOF:      NO   YES
   TYPE:INFO        ADDR:__   P/F:X
MON:   EIA   NO   YES

MON:   FLAGS   NO   YES
MON:   TIMEOUT                       NO   YES
```

Figure 33-5 Note fields enabled by FRAME selection on FOR line.

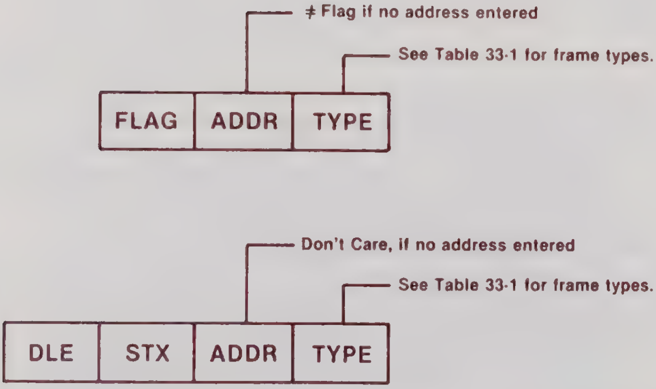

≠ Flag if no address entered
See Table 33-1 for frame types.
FLAG
ADDR
TYPE
Don't Care, if no address entered
See Table 33-1 for frame types.
DLE
STX
ADDR
TYPE

Figure 33-6 Strings trigger logic looks for when FRAME is selected: top, 7E/X.25, SDLC, or SDLC/NRZI; bottom, BSC/X.25.

When Block Check is ON, a Good BCC is shown by replacing the second block check character with a low-intensity reverse-image G; Bad BCC by a bright reverse-image B. Aborted blocks are not indicated.

When Block Check is OFF, no received data block check calculations are done except for the frame and packet protocol mnemonic display. When data is displayed, both block check characters actually received or transmitted by the 4600 are displayed. Block check calculations may still be transmitted (selected on the SET XMIT line of a Trigger Actions menu), but the G and B symbols will not be displayed.

The block check polynomial is CRC-16, X16 + X15 + X2 + 1. Block check starts with DLE STX and stops with DLE ETX. The calculation ignores DLE whenever it is followed by any character except SY. When DLE is followed by SY, both are ignored. No Block Check is calculated following DLE ENQ (abort).

33.7 TRIGGER MONITOR CONDITIONS

NOTE: When the DDCMP software option (Option 24) is installed, the Trigger Frame and Packet conditions explained below are not available.

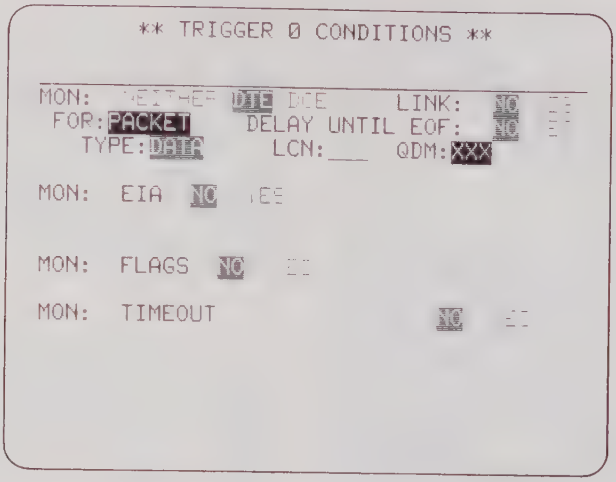
(a) Inserted Zeros. When 7E/X.25, SDLC, or SDLC/NRZI is selected, the 4600's string search logic ignores inserted zeros. You can specify the search string on the Trigger Conditions menu without considering zero insertion.

(b) Inserted DLE. If BSC/X.25 has been selected on the Parameters 1 menu, the 4600 does not see inserted DLE and DLE SYN in string searches even though it does display and record them. Once the 4600 has seen a DLE STX, it will ignore the first DLE in a sequence, and this enables it to ignore inserted DLE and DLE SYN.

In this protocol, the end-of-frame sequence is DLE ETX. The 4600 will not detect DLE ETX since it will ignore the DLE. To find an end-of-frame sequence in BSC/X.25, use the string ETX DC DC FF.

(c) Frame. For BSC/X.25, 7E/X.25, SDLC, and SDLC/NRZI, the Trigger MON Conditions (FOR field on Line 5) include FRAME (see Figure 33-5). Figure 33-6 shows the strings the 4600 will look for when FRAME is selected.

The TYPE field is a window field like the FOR field. The Frame selections in the rotation are INFO, RR, RNR, REJ, SREJ, SARM, SABM, DISC, UA, FRMR, TEST, XID, SNRM, and OTHER 00, in that order. Table 33-1 defines these selections. An X in the bit pattern in Table 33-1 means Don't Care; the string search logic will ignore this bit. In the ADDR field, enter a two-digit hexadecimal number, using the blue keys, but not the HEX key. If there is no entry in the ADDR field, the string search will ignore the address; if only one hexadecimal digit is entered in the ADDR field, it will be taken as the four lower-order bits and the string search will look for the four high-order bits to be 0's.



```
             ** TRIGGER 0 CONDITIONS **

MON:   NEITHER DTE DCE        LINK:       NO   YES
 FOR:PACKET     DELAY UNTIL EOF:       NO   YES
   TYPE:DATA       LCN:___     QDM:XXX

MON:   EIA   NO   YES


MON:   FLAGS   NO   YES

MON:   TIMEOUT                         NO   YES
```

Figure 33-7 Note fields enabled by PACKET selection on FOR line.

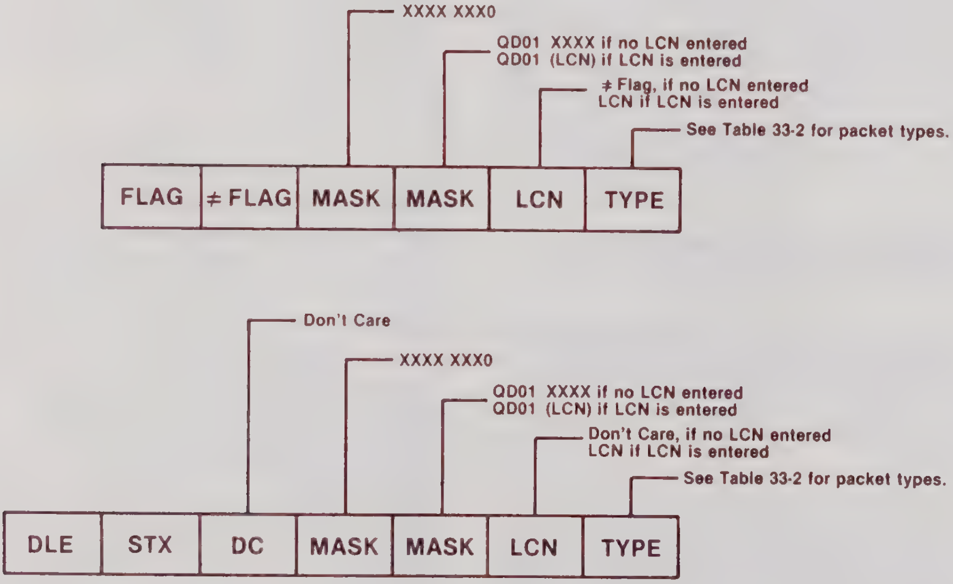

XXXX XXX0
QD01 XXXX if no LCN entered
QD01 (LCN) if LCN is entered
≠ Flag, if no LCN entered
LCN if LCN is entered
See Table 33-2 for packet types.
FLAG
≠ FLAG
MASK
MASK
LCN
TYPE
Don't Care
XXXX XXX0
QD01 XXXX if no LCN entered
QD01 (LCN) if LCN is entered
Don't Care, if no LCN entered
LCN if LCN is entered
See Table 33-2 for packet types.
DLE
STX
DC
MASK
MASK
LCN
TYPE

Figure 33-8 Strings trigger logic looks for when PACKET is selected: top, 7E/X.25; bottom, BSC/X.25.

In the P/F field, enter 1 or 0 if you want the P/F bit to be monitored. The default entry is X, Don't Care.

(d) Packet. This selection (Figure 33-7) will appear in the window on Line 5 only for BSC/X.25 and 7E/X.25. Figure 33-8 shows the strings the trigger logic will look for when PACKET is selected.

The packet TYPE selections that can be rotated into the TYPE window are defined in Table 33-2.

In the LCN field enter a three-digit hexadecimal number for the LCN you want the trigger to look for. Use the blue keys in this field, but not the HEX key. If there is no entry in the LCN field, the string search will ignore the LCN. If only 1 or 2 digits are entered in the LCN field, the logic will regard them as the lower-order bits and look for zeros in the high-order positions.

QDM is the last field on Line 5. Enter 1 or 0 in the first position in the field if you want the trigger to look for the Q bit, in the second position for the D bit, and in the third position to look for the M bit. Enter an X to have the search logic ignore a bit (X, Don't Care, is the default entry).

If the Q, D, or M bit has no meaning for the currently selected packet TYPE, the search logic will ignore it even if a 1 or 0 has been entered in that position in the QDM field.

TABLE 33-1
FRAME-TYPE SELECTIONS ON TRIGGER CONDITIONS MENUS

TYPE Selection	Definition	Bit Pattern (Note 1)							
		8	7	6	5	4	3	2	1
USE RIGHT CURSOR ARROW TO START HERE									
INFO	INFOrmation	X	X	X	P/F	X	X	X	0
RR	Receiver Ready	X	X	X	P/F	0	0	0	1
RNR	Receiver Not Ready	X	X	X	P/F	0	1	0	1
REJ	REJect	X	X	X	P/F	1	0	0	1
SREJ	Selective REJect	X	X	X	P/F	1	1	0	1
SARM	Set Asynchronous Response Mode	0	0	0	P/F	1	1	1	1
SABM	Set Asynchronous Balanced Mode	0	0	1	P/F	1	1	1	1
DISC	DISConnect	0	1	0	P/F	0	0	1	1
UA	Unnumbered Acknowledgment	0	1	1	P/F	0	0	1	1
FRMR	FRaMe Reject	1	0	0	P/F	0	1	1	1
TEST	link TEST	1	1	1	P/F	0	0	1	1
XID	eXchange station ID	1	0	1	P/F	1	1	1	1
SNRM	Set Normal Response Mode	1	0	0	P/F	0	0	1	1
OTHER 00	User-defined frame type	Enter hexadecimal equivalent of bit pattern desired by writing over 00. If there is no entry, the logic will look for 0000 0000.							
USE LEFT CURSOR ARROW TO START HERE									

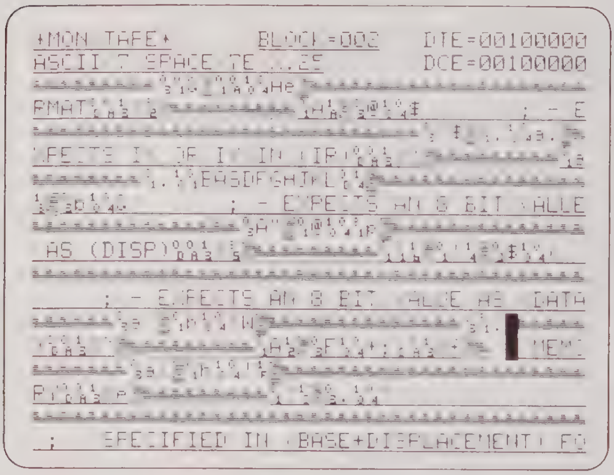
Note 1: X = Don't Care; P/F value is entered on Conditions Menu.

TABLE 33-2

PACKET-TYPE SELECTIONS ON TRIGGER CONDITIONS MENUS

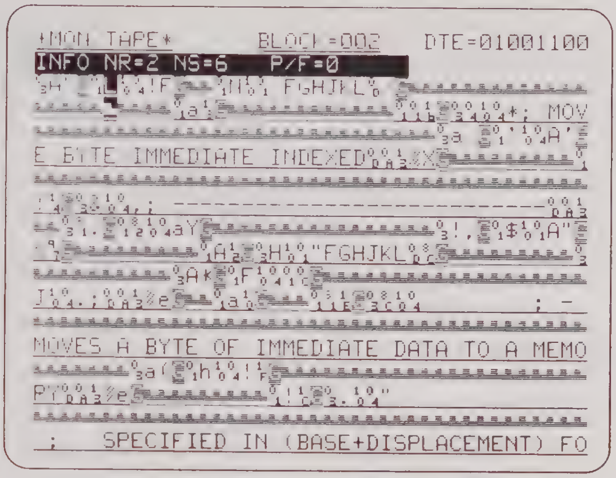
TYPE Selection	Definition	Bit Pattern (Note 1) 8 7 6 5 4 3 2 1
USE RIGHT CURSOR ARROW TO START HERE		
DATA	DATA	X X X M X X X 0
RR	Receiver Ready	X X X 0 0 0 0 1
RNR	Receiver Not Ready	X X X 0 0 1 0 1
REJECT	REJECT	X X X 0 1 0 0 1
INT	INTerrupt	0 0 1 0 0 0 1 1
INT CNF	INTerrupt CoNFirm	0 0 1 0 0 1 1 1
DIAG	DIAGnostic	1 1 1 1 0 0 0 1
OTHER 00	User-defined packet type	Enter hexadecimal equivalent of bit pattern desired by writing over 00. If there is no entry, logic will look for 0000 0000.
RSTRT C	ReSTaRT Confirm	1 1 1 1 1 1 1 1
RSTRT R	ReSTaRT Request	1 1 1 1 1 0 1 1
RESET C	RESET Confirm	0 0 0 1 1 1 1 1
RESET I	RESET Indication	0 0 0 1 1 0 1 1
CLEAR C	CLEAR Confirm	0 0 0 1 0 1 1 1
CLEAR R	CLEAR Request	0 0 0 1 0 0 1 1
CALL AC	CALL ACcept	0 0 0 0 1 1 1 1
CALL RQ	CALL ReQuest	0 0 0 0 1 0 1 1
USE LEFT CURSOR ARROW TO START HERE		

Note 1: X = Don't Care. M is selected on the Trigger Conditions menu.



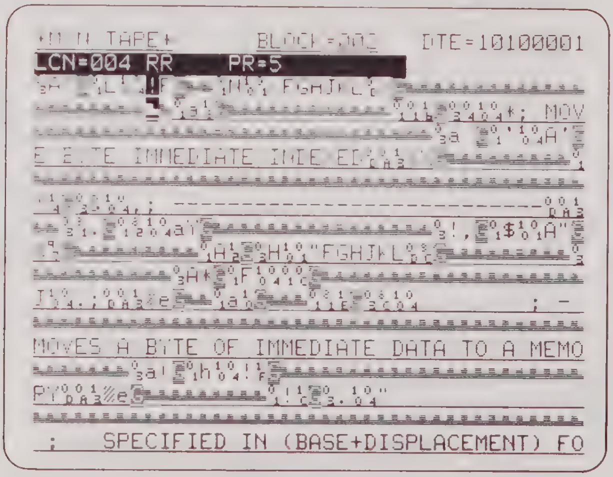
```
*MON TAPE*          BLOCK=002       DTE=00100000
ASCII                               DCE=00100000
FMAT                                        ; - E
            ; - EXPECTS AN 8 BIT VALUE
 AS (DISP)
      ; - EXPECTS AN 8 BIT VALUE AS  DATA
                                          MEM
  ;    SPECIFIED IN (BASE+DISPLACEMENT) FO
```

Figure 34-1



```
*MON TAPE*          BLOCK=002       DTE=01001100
INFO NR=2 NS=6    P/F=0
                    FGHJKL
                                          *; MOV
E BYTE IMMEDIATE INDEXED
          ; ------------------------------
                  "FGHJKL
                                              ; -
MOVES A BYTE OF IMMEDIATE DATA TO A MEMO
  ;    SPECIFIED IN (BASE+DISPLACEMENT) FO
```

Figure 34-2



```
*MON TAPE*          BLOCK=002       DTE=10100001
LCN=004 RR      PR=5
                    FGHJKL
                                          *; MOV
E BYTE IMMEDIATE INDEXED
          ; ------------------------------
                  "FGHJKL
                                              ; -
MOVES A BYTE OF IMMEDIATE DATA TO A MEMO
  ;    SPECIFIED IN (BASE+DISPLACEMENT) FO
```

Figure 34-3

34

BIT-ORIENTED PROTOCOLS: SPECIAL DISPLAYS

34.1 AUTOMATIC FRAME AND PACKET LOCATORS

When data is displayed, the 4600 can locate frames and packets automatically. If BSC/X.25 or 7E/X.25 has been selected on the Parameters 1 menu, both frame and packet locators can be used. You may choose any frame or packet on the CRT screen and the 4600 will automatically find the frame-control byte or packet-type octet and display a mnemonic expansion of it. The frame locator is also valid for SDLC and SDLC/NRZI. The mnemonics that may be displayed are given in Tables 34-1 and 34-2.

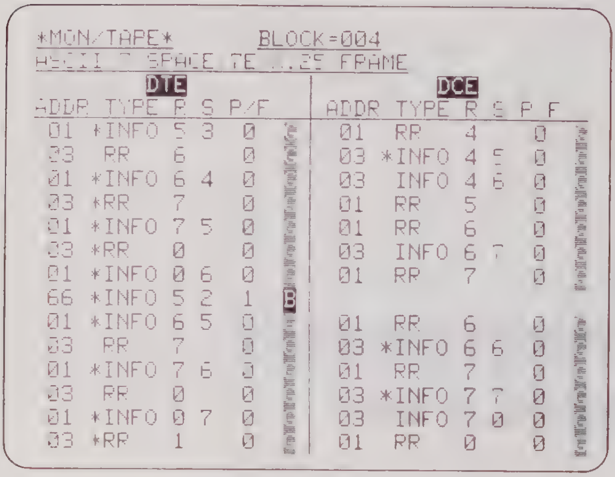
There are also manual frame and packet locators, which are explained in Section 34.2.

With the data display manually frozen (Figure 34-1), press the B key to display the beginning of the CRT buffer. Then press the F key once to automatically tab the cursor to the next frame-control byte (see Figure 34-2). The mnemonics for the control frame type, the sequence number (or numbers), and the P/F bit value will be displayed on the second line. The binary breakdown of the control byte at the cursor location will be displayed at the upper right.

Notice that the binary expansion is given with the first bit sent (low-order bit) at the far right and the highest-order bit to the left. In dealing with bit-oriented protocols it is important to remember that there are considerable discrepancies in the literature regarding the order in which the bits are presented on paper, as well as how they are numbered.

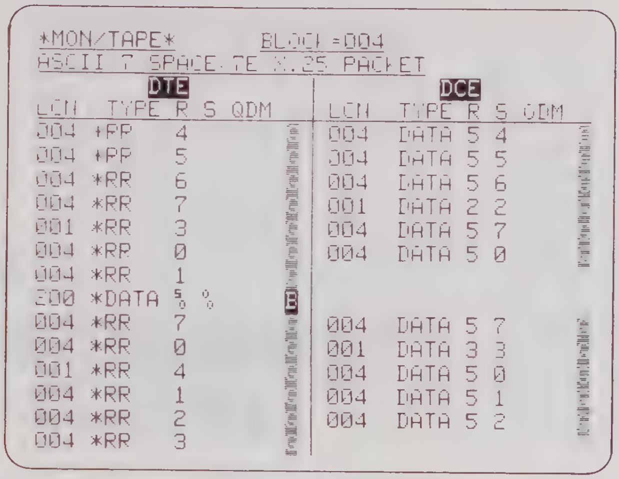
In dual-line display, of course, the frame-control byte or packet-type octet expansion only applies to one of the two cursor characters, but this is easily identified because the single binary breakdown at the upper right of the display is labeled as DTE or DCE. (See Figure 34-2.)

To find the next packet-type octet (Octet 3), use the P key; the cursor will tab to the byte (Figure 34-3). On the second line the 4600 will display the logical channel number and the sequence count modulus. For modulo 8, the packet sequence numbers, P(S) and P(R), will be given, and if the Q, D, or M bit is 1, the letter symbol will be displayed.



```
*MON/TAPE*          BLOCK=004
ASCII 7 SPACE TE X.25 FRAME
           DTE                           DCE
ADDR TYPE  R S P/F         ADDR TYPE  R S P F
 01  *INFO 5 3  0           01   RR   4     0
 03   RR   6    0           03  *INFO 4 5   0
 01  *INFO 6 4  0           03   INFO 4 6   0
 03  *RR   7    0           01   RR   5     0
 01  *INFO 7 5  0           01   RR   6     0
 03  *RR   0    0           03   INFO 6 7   0
 01  *INFO 0 6  0           01   RR   7     0
 66  *INFO 5 2  1      B
 01  *INFO 6 5  0           01   RR   6     0
 03   RR   7    0           03  *INFO 6 6   0
 01  *INFO 7 6  0           01   RR   7     0
 03   RR   0    0           03  *INFO 7 7   0
 01  *INFO 0 7  0           03   INFO 7 0   0
 03  *RR   1    0           01   RR   0     0
```

Figure 34-4



```
*MON/TAPE*          BLOCK=004
ASCII 7 SPACE TE X.25 PACKET
           DTE                           DCE
LCN  TYPE  R S QDM         LCN  TYPE  R S QDM
004 *RR    4               004  DATA  5 4
004 *RR    5               004  DATA  5 5
004 *RR    6               004  DATA  5 6
004 *RR    7               001  DATA  2 2
001 *RR    3               004  DATA  5 7
004 *RR    0               004  DATA  5 0
004 *RR    1
200 *DATA  ⁵₀ %         B
004 *RR    7               004  DATA  5 7
004 *RR    0               001  DATA  3 3
001 *RR    4               004  DATA  5 0
004 *RR    1               004  DATA  5 1
004 *RR    2               004  DATA  5 2
004 *RR    3
```

Figure 34-5

Within an information frame, alternate use of the F and P keys moves the cursor between the frame-control byte and the packet-type octet of that frame until one of the two keys is operated twice consecutively.

To return to any byte you have already seen, you may use the UP cursor arrow to reposition the cursor; then use the F or P key again.

> NOTE: No CRT enhancements should be programmed on either triggers or the Parameters 2 menu when the automatic frame or packet locator is being used. This is because the automatic locators use the automatic CRT enhancements in the four BOP modes for reference to find the control bytes. Also, all leading bytes (Address, Control, Octets 1-3) must be in the display buffer for complete expansion. Therefore, if triggers have been programmed to freeze and unfreeze data, or if any data is suppressed, using F and P may not produce correct information in the mnemonic expansion line.

34.2 MANUAL FRAME AND PACKET LOCATORS

You may obtain a mnemonic expansion for any character on the frozen data screen by positioning the cursor at the desired byte with the cursor arrows; then pressing CONTROL-F or CONTROL-P. Remember, though, that in this case the logic cannot distinguish between a genuine frame-control byte or packet-type octet and the numerous invalid possibilities.

In dual-line mode, you may also select the lead to which you wish CONTROL-F or CONTROL-P to apply. Pressing T before CONTROL-F or P selects TD; R selects RD. Either lead selection remains in effect until you cancel it by selecting the other lead. The PROGRAM key cancels both T and R.

34.3 PROTOCOL MNEMONIC DISPLAY

When FRAME or PACKET is selected for Display Mode on the Parameters 2 CRT Control menu -- and if the data source is TAPE or RAM -- you will see a sequential display of only frame (level 2) or packet (level 3) protocol in Run Mode.

34.3.1 Display Description

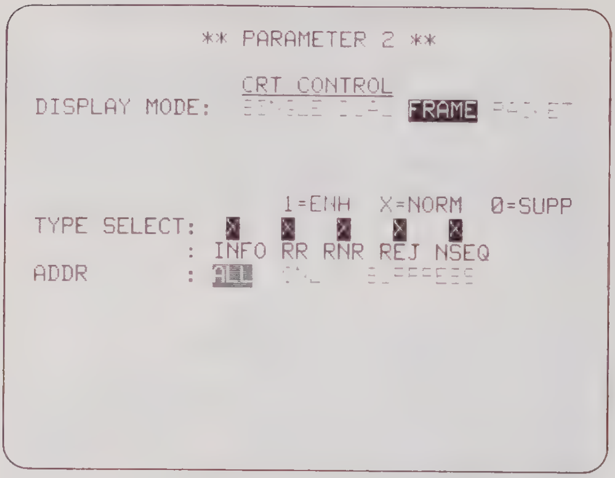
For either Frame or Packet display, the protocol is listed in two columns (see Figures 34-4 and 34-5), with DTE on the left and DCE on the right. As new data is received, the display scrolls up, so the oldest received frames or packets are at the top of the screen. If multiple frames or packets are received on one side of the line, then spaces are inserted on the other side to maintain time correlation between TD and RD. If a frame or packet has been suppressed on the Parameters 2 menu, a space is shown in its place.

If two frames or packets are received at about the same time, they are displayed on the same line. An asterisk precedes the control-type mnemonic of the frame or packet that was received first.

The mnemonics displayed are listed in Tables 34-1 and 34-2. For either display, blocks will be identified as Good, Bad, or Aborted by reverse-image G, B, or A as on the data display.

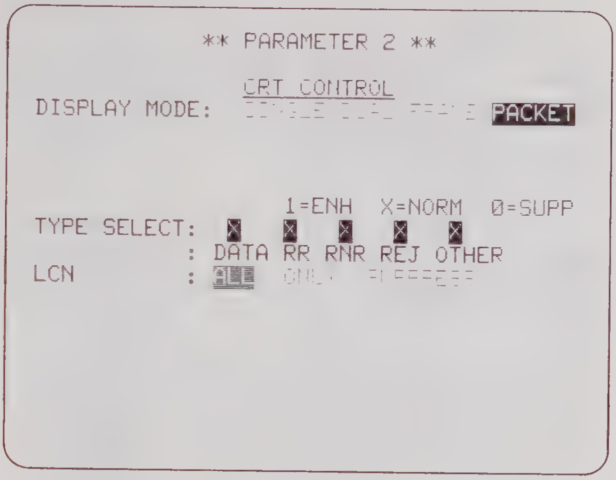
In the frame display, the address, control type, N(R) and N(S) counts, P/F bit status, and frame check are shown.

You may select PACKET only if you have selected BSC/X.25 or 7E/X.25 for Format on the Parameters 1 menu. The packet display will show LCN (logical channel number), packet type, and P(R) and P(S) counts. Q, D, and M will be displayed when they are ON.



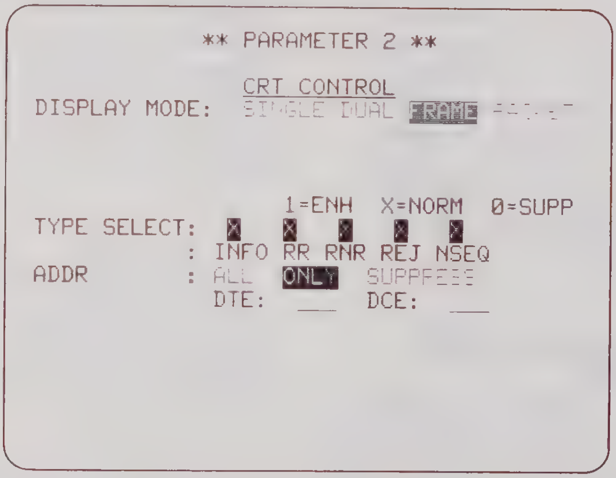
```
              ** PARAMETER 2 **

                   CRT CONTROL
DISPLAY MODE:      SINGLE DUAL FRAME PACKET



                        1=ENH   X=NORM   0=SUPP
TYPE SELECT:     X    X    X    X    X
           :    INFO  RR  RNR  REJ  NSEQ
ADDR       :    ALL   ONLY    SUPPRESS
```

Figure 34-6



```
              ** PARAMETER 2 **

                   CRT CONTROL
DISPLAY MODE:      SINGLE DUAL FRAME PACKET



                        1=ENH   X=NORM   0=SUPP
TYPE SELECT:     X    X    X    X    X
           :    DATA  RR  RNR  REJ  OTHER
LCN        :    ALL   ONLY    SUPPRESS
```

Figure 34-7



```
              ** PARAMETER 2 **

                   CRT CONTROL
DISPLAY MODE:      SINGLE DUAL FRAME PACKET



                        1=ENH   X=NORM   0=SUPP
TYPE SELECT:     X    X    X    X    X
           :    INFO  RR  RNR  REJ  NSEQ
ADDR       :    ALL   ONLY    SUPPRESS
                DTE:  ___    DCE:  ___
```

Figure 34-8

In some nonsequenced packet types there are additional bytes of interest. In these cases, since there are no P(R) or P(S) counts, the space reserved for P(R) and P(S) is used to display the additional causing characters in hexadecimal. For CALL and INTERRUPT packets, one additional byte is displayed (Octet 4), and for CLEAR, RESET, RESTART, and DIAGNOSTIC packets, two extra bytes (Octets 4 and 5; see Figure 34-5) are shown. For modulo 128 the display is LCN followed by MOD 128.

34.3.2 Display Control and Highlights

When FRAME or PACKET is selected on the Parameters 2 menu, the SUPPRESS and ENHANCE fields disappear and two new fields are shown.

(a) Type Select. This is a data-entry field that appears upon selection of FRAME or PACKET. If FRAME is selected (Figure 34-6), this field includes INFO, RR, RNR, REJ, and NSEQ. If PACKET is selected (Figure 34-7), the list will be DATA, RR, RNR, REJ, and OTHER.

The default condition is normal (X) video display of the expansions of the five selections. Enter 1's for any of the frame or packet types to display the selected frame or packet expansions in low-intensity reverse image. Enter 0's to suppress display of any selections.

(b) Addr/LCN. This selection also appears only when FRAME (Figure 34-6) or PACKET (Figure 34-7) is selected in the DISPLAY MODE field. There are two fields for this selection. The first line is a data selection field. For the default selection ALL, mnemonic expansions for all traffic are displayed. If you select ONLY, only the traffic for the address or LCN entered on the next line (Figure 34-8) will be displayed. SUPPRESS prevents display of the expansions for the address or LCN entered on the next line.

On the next line, you may select either DTE or DCE or both by entering the address(es) or LCN number(s) in which you are interested. If you have selected FRAME on the DISPLAY MODE line above, enter the two-digit hexadecimal frame level address in the DTE or DCE entry field or in both. If you have selected PACKET above, enter the three-digit hexadecimal logical channel number, or numbers, in hexadecimal in the DTE or DCE entry field or in both.

34.3.3 Playback Control

Just as for data display, you can speed up or slow down the playback with the UP or DOWN cursor arrow. You may freeze and unfreeze the protocol display with the CRT CONTROL keys; then scroll through the buffer using the UP and DOWN cursor arrows; or go to the beginning or the end of the buffer using the B or the E key.

The trigger program will continue to run while protocol is displayed. Counters and timers can still be read. However, no CRT enhancements other than Clear CRT and Freeze should be programmed.

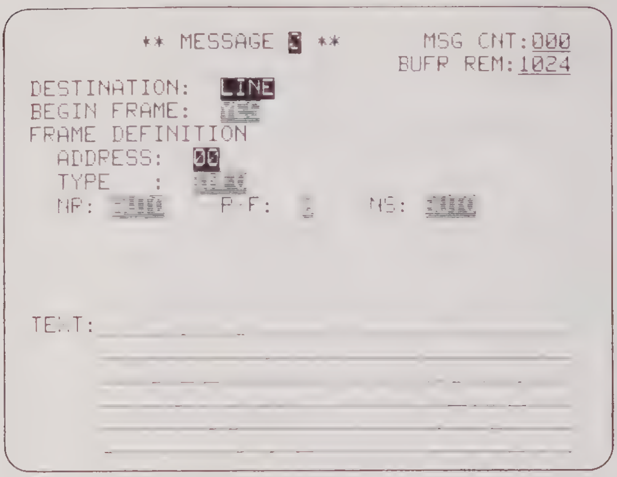
TABLE 34-1
FRAME-CONTROL MNEMONICS

Bit Pattern								SDLC or SDLC NRZI		7E/X.25 or BSC/X.25	
8	7	6	5	4	3	2	1	Mnemonic	Definition	Mnemonic	Definition
N(R)			P	N(S)			0	INFO	INFOrmation	INFO	INFOrmation
N(R)			P/F	0	0	0	1	RR	Receiver Ready	RR	Receiver Ready
N(R)			P/F	0	1	0	1	RNR	Receiver Not Ready	RNR	Receiver Not Ready
N(R)			P/F	1	0	0	1	REJ	REJect	REJ	REJect
N(R)			P/F	1	1	0	1	SREJ	Selective REJect	SREJ	Selective REJect
0	0	0	P/F	0	0	1	1	NSI	Non-Sequenced Information	---	---
0	0	0	P/F	0	1	1	1	SIM/RQI	Set Initialization Mode/ReQuest Initialization	---	---
0	0	0	F	1	1	1	1	SARM/ROL	Set Asynchronous Response Mode/ Request OnLine	DM/SARM	Disconnect Mode/ Set Asynchronous Response Mode
0	0	1	P/F	0	0	1	1	NSP	Non-Sequenced Poll	---	---
0	0	1	P	1	1	1	1	---	---	SABM	Set Asynchronous Balance Mode
0	1	0	P	0	0	1	1	DISC/RQD	DISConnect/ReQuest Disconnect	DISC	DISConnect
0	1	0	P/F	0	1	1	1	RGA	Remote Go-Ahead	---	---
0	1	1	F	0	0	1	1	NSA	Non-Sequenced Acknowledge	UA	Unnumbered Acknowledge
1	0	0	F	0	1	1	1	CMDR	CoMmanD Reject	FRMR	FRaMe Reject
1	0	0	F	0	0	1	1	SNRM	Set Normal Response Mode	---	---
1	0	1	P/F	1	1	1	1	XID	eXchange station ID	---	---
1	1	0	P/F	0	1	1	1	CFGR	ConFIGuRe	---	---
1	1	1	P/F	0	0	1	1	TEST	link TEST	---	---
1	1	1	F	1	1	1	1	BCN	BeaCoN	---	---
All other patterns									UNKNOWN		UNKNOWN

TABLE 34-2

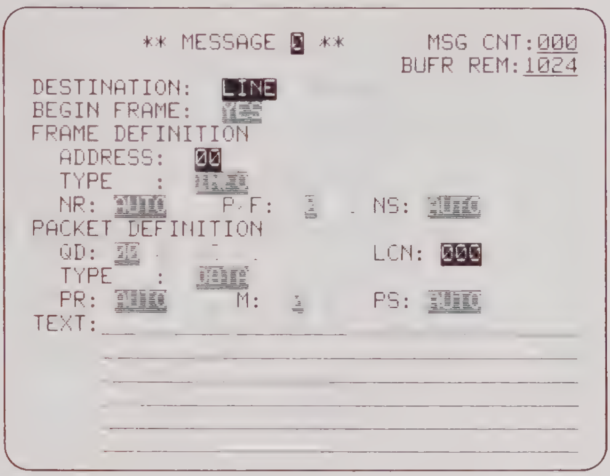
PACKET-TYPE MNEMONICS

Octet 3								Display		
8	7	6	5	4	3	2	1	(XXX=HEX 000-FFF)	Mnemonic	Definition
0	0	0	0	1	0	1	1	LCN = XXX	CALL	CALL
0	0	0	0	1	1	1	1	LCN = XXX	CALL ACC	CALL ACCept
0	0	0	1	0	0	1	1	LCN = XXX	CLEAR	CLEAR
0	0	0	1	0	1	1	1	LCN = XXX	CLEAR C	CLEAR Confirm
P(R)			M	P(S)			0	LCN = XXX	DATA	DATA
1	1	1	1	0	0	0	1	LCN = XXX	DIAG	DIAGnostic
0	0	1	0	0	0	1	1	LCN = XXX	INT	INTerrupt
0	0	1	0	0	1	1	1	LCN = XXX	INT CONF	INTerrupt CONFirm
P(R)			0	0	0	0	1	LCN = XXX	RR	Receiver Ready
P(R)			0	0	1	0	1	LCN = XXX	RNR	Receiver Not Ready
P(R)			0	1	0	0	1	LCN = XXX	REJ	REJect
0	0	0	1	1	0	1	1	LCN = XXX	RESET	RESET
0	0	0	1	1	1	1	1	LCN = XXX	RESET C	RESET Confirm
1	1	1	1	1	0	1	1	LCN = XXX	RSTRT	ReSTaRT
1	1	1	1	1	1	1	1	LCN = XXX	RSTRT C	ReSTaRT Confirm
P(R)			0	1	1	0	1	LCN = XXX	SREJ	Selective REJect
All other									UNKNOWN	



```
          ** MESSAGE [illegible] **      MSG CNT:000
                                       BUFR REM:1024
DESTINATION:  LINE
BEGIN FRAME:  YES
FRAME DEFINITION
  ADDRESS:  00
  TYPE    :  [illegible]
  NR: AUTO      P/F: [illegible]     NS: AUTO



TEXT:
```

Figure 35-1 A default message-entry menu with FORMAT:SDLC selected on Parameters 1.



```
          ** MESSAGE [illegible] **      MSG CNT:000
                                       BUFR REM:1024
DESTINATION:  LINE
BEGIN FRAME:  YES
FRAME DEFINITION
  ADDRESS:  00
  TYPE    :  [illegible]
  NR: AUTO      P/F: [illegible]      NS: AUTO
PACKET DEFINITION
  QD: [illegible]                     LCN: 000
  TYPE    :  DATA
  PR: AUTO      M: [illegible]        PS: AUTO
TEXT:
```

Figure 35-2 Default message-entry menu with FORMAT:BSC/X.25 or 7E/X.25 selected on Parameters 1.

TABLE 35-1

7E/X.25 AND SDLC IDLE LINE CONDITIONS

Line Use Selection (Parameters 4 Menu)	Idle Line Condition
Switched	Idles FFs (8 consecutive 1's) between frames (that is, between closing and opening flags).
FDX	Idles flags.
Em Host	Idles flags.
Em Drop	Idles FFs (8 consecutive 1's) between frames (that is, between closing and opening flags).

35

BIT-ORIENTED PROTOCOLS: INTERACTIVE OPERATION

35.1 BLOCK CHECK CALCULATIONS

For the three HDLC protocol selections, select GD, BD, or ABort on the Set Xmit line of the Trigger Actions menu. The BCC type for these formats is always automatically selected (see Section 14). For BSC/X.25, the BCC type is also automatic but NO replaces the ABort selection on the Set Xmit line.

For the HDLC formats, CRC-16 will be transmitted for bad BCC; for BSC/X.25, the transmitted bad BCC will be an inverted good BCC.

35.2 IDLE LINE CONDITION

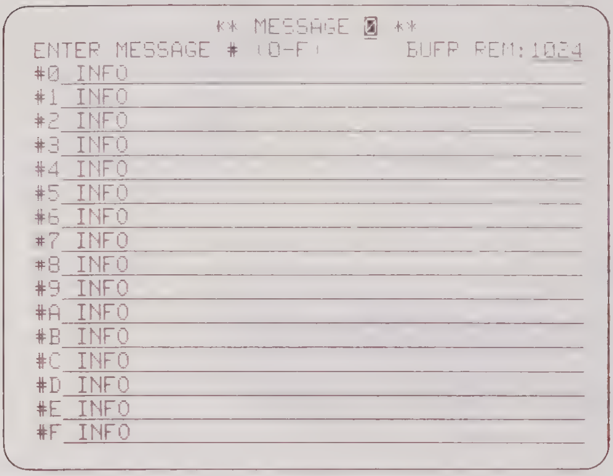
Table 35-1 shows the idle line condition generated by the 4600. The idle condition is maintained in Program Mode as well as Run Mode.

When 7E/X.25 has been selected, the 4600 does not consider 7 consecutive 1's between closing and opening flags to be an abort. When SDLC or SDLC/NRZI is selected, the 4600 considers 7 consecutive 1's between closing and opening flags to be an abort and will display an abort.

35.3 THE MESSAGE SUMMARY

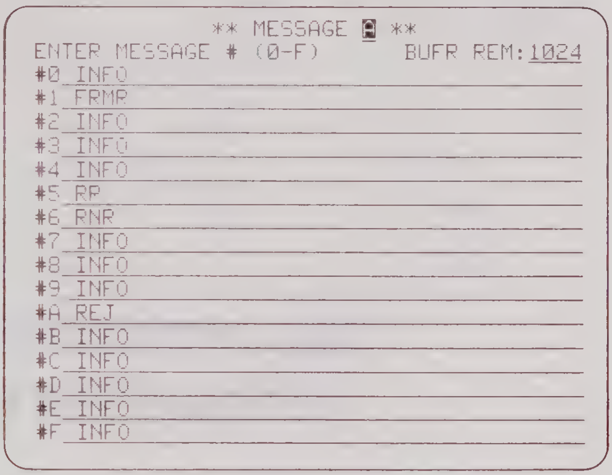
For BSC/X.25 and the 4600's three HDLC-framed formats, frame protocol for all transmissions is selected by filling out special fields on the message-entry menus (see Figure 35-1, for example). For BSC/X.25 and 7E/X.25, there are also packet-definition fields (see Figure 35-2).

When an SDLC format is selected on the Parameters 1 menu, at the beginning of each line on the Message Summary the 4600 displays the frame type currently selected on the message-entry menu. The default display is INFO, for INFOrmation frames.



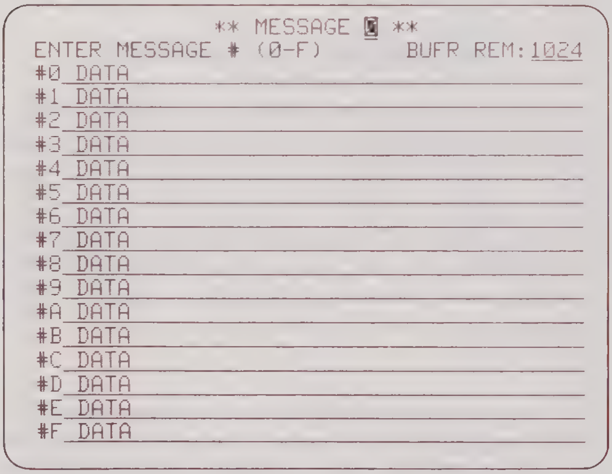
```
           ** MESSAGE 0 **
ENTER MESSAGE # (0-F)        BUFR REM:1024
#0 INFO
#1 INFO
#2 INFO
#3 INFO
#4 INFO
#5 INFO
#6 INFO
#7 INFO
#8 INFO
#9 INFO
#A INFO
#B INFO
#C INFO
#D INFO
#E INFO
#F INFO
```

Figure 35-3 Default Message Summary for SDLC or SDLC/NRZI.



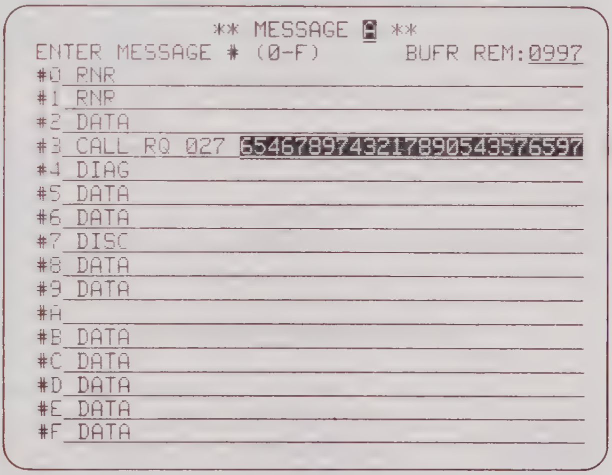
```
           ** MESSAGE A **
ENTER MESSAGE # (0-F)        BUFR REM:1024
#0 INFO
#1 FRMR
#2 INFO
#3 INFO
#4 INFO
#5 RR
#6 RNR
#7 INFO
#8 INFO
#9 INFO
#A REJ
#B INFO
#C INFO
#D INFO
#E INFO
#F INFO
```

Figure 35-4 Example of Message Summary for SDLC or SDLC/NRZI with various frame types selected.



```
           ** MESSAGE 0 **
ENTER MESSAGE # (0-F)        BUFR REM:1024
#0 DATA
#1 DATA
#2 DATA
#3 DATA
#4 DATA
#5 DATA
#6 DATA
#7 DATA
#8 DATA
#9 DATA
#A DATA
#B DATA
#C DATA
#D DATA
#E DATA
#F DATA
```

Figure 35-5 Default Message Summary for BSC/X.25 or 7E/X.25.



```
           ** MESSAGE A **
ENTER MESSAGE # (0-F)        BUFR REM:0997
#0 RNR
#1 RNR
#2 DATA
#3 CALL RQ 027 6546789743217890543576597
#4 DIAG
#5 DATA
#6 DATA
#7 DISC
#8 DATA
#9 DATA
#A
#B DATA
#C DATA
#D DATA
#E DATA
#F DATA
```

Figure 35-6 Example of Message Summary for BSC/X.25 or 7E/X.25 with various frame types selected.

Figure 35-3 shows the default Message Summary for SDLC; Figure 35-4 shows the same menu with other frame types selected.

When an X.25 format is selected on Parameters 1 and INFO frame is selected on a Message-Entry menu, the Message Summary will display the packet type for that menu. Figure 35-5 shows the default Message Summary for X.25; Figure 35-6 shows a summary for X.25 when other frame and packet types are selected. Notice that entries in fields such as DIAGNOSTICS and CALLING DTE ADDR that actually utilize the first line of the Text area appear on the summary.

If a message-entry menu does not begin a frame, the frame- or packet-type field on the summary will be left blank.

35.4 USING THE MESSAGE-ENTRY MENUS

The selections for automatic transmission of protocol bytes appear on a Message-Entry menu only when --

(1) the Parameters 1 Format selection is BSC/X.25, 7E/X.25, SDLC, or SDLC/NRZI;

(2) LINE is selected in the DESTINATION field of the Message-Entry menu; and YES is selected for BEGIN FRAME.

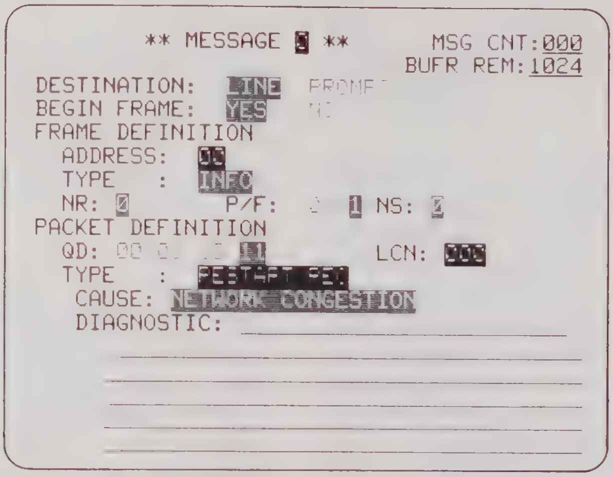
For 7E/X.25 and BSC/X.25 (see Figure 35-2), both FRAME and PACKET DEFINITION selections will be displayed. For SDLC and SDLC/NRZI (Figure 35-1), only FRAME DEFINITION selections are shown, and any level 3 protocol should be entered in the Text fields of the menu.

(a) Bit Patterns and Hexadecimal Entries. In the 4600, bit patterns are displayed with Bit 8 -- the last bit sent -- as the highest-order bit and Bit 1 -- first bit sent -- as the lowest-order bit. Be sure to follow this convention whenever you are converting binary to hexadecimal for making a data entry on a menu.

In the Frame and Packet Definition fields of the Message-Entry menus (lines 5 through 12), all hexadecimal entries are made without the HEX key and each hexadecimal digit is given one full character position in the field. The HEX key is illegal in these fields.

When CALL ACC or CALL REQUEST has been selected for packet type, the CALLING DTE ADDR field (line 13) and the CALLED DTE ADDR field (line 14) accept only decimal numbers: all hexadecimal entries are illegal.

With those two exceptions, the HEX key is legal on lines 13 through 18 and must be used to make hexadecimal entries, and every two consecutive hexadecimal digits are displayed in one character space.



```
          ** MESSAGE 3 **        MSG CNT:000
                                BUFR REM:1024
DESTINATION:   LINE   PROMPT
BEGIN FRAME:   YES    NO
FRAME DEFINITION
  ADDRESS:   03
  TYPE    :  INFO
  NR: 0        P/F:  0  1 NS: 2
PACKET DEFINITION
  QD: 00 01 10 11          LCN: 000
  TYPE    :  RESTART REQ
   CAUSE: NETWORK CONGESTION
   DIAGNOSTIC:
```

Figure 35-7

(b) Window Selection Fields. The following fields shown in Figure 35-2 are rotating selection fields: frame TYPE, NR, NS, packet TYPE, PR, and PS. In addition, for certain Packet TYPE selections, a CAUSE field is displayed as shown in Figure 35-7. The CAUSE fields are also window selection fields.

Use the RIGHT and LEFT cursor arrows to display the window field selections. The RIGHT cursor arrow will sequence the selections in a predetermined order; the LEFT arrow will display the same selections in the reverse order. To go to the next field to the right or left of a rotating field, always use the ENTER key or the UP cursor arrow followed by ENTER. The RIGHT or LEFT arrow will only change your selection by displaying the next rotating selection.

> NOTE: All entries in fields resulting from your window selection are stored when you change the window selection.

(c) Destination. This is the first field on the menu. To transmit protocol bytes LINE must be selected. When PROMPT is selected, the protocol selections will not be displayed.

(d) Begin Frame. The default selection is YES, which enables all the following selections on the menu. If you select NO, only the TEXT lines will remain. Select NO if the text is to be a continuation of a frame entered on another message menu, or if the text will consist of BISYNC framing characters (when BSC/X.25 format is selected).

35.5 FRAME DEFINITION FIELDS

(a) Address. Enter the address byte as a two-digit hexadecimal character (the HEX key is not needed). Any key except 0 through F (the blue keys) will be rejected with a key error message. If you neglect to enter an address, 00 (hex) will be transmitted.

(b) Type. This is a window selection field that defaults to frame type INFO. Use the RIGHT cursor arrow to "roll" the display through the following selections: RR, RNR, REJ, SREJ, SARM, SABM, DISC, UA, FRMR, TEST, XID, SNRM, and OTHER 00. The LEFT cursor arrow displays these selections in the reverse order. Table 35-2 shows the bit pattern that will be transmitted as the frame-control byte for each of these selections.

OTHER 00 is a data-entry field in which you can specify any bit pattern for the frame-type byte by entering a two-digit hexadecimal number (the HEX key is not used in this field).

The Type selection determines which of three fields -- NR, P/F, and NS -- will be displayed on the next line (see Table 35-3).

(c) NR (Receive Sequence Count). This is a window field with two selections. AUTO is the default selection. If you select AUTO, the N(R) sent will be the last good received N(S) incremented by 1. The received N(S) is good if it is in sequence and the block had a good block check. The 4600 will not increment the N(R) count until a good N(S) is received.

The alternative selection in the window is a data-entry field in which you may enter a numerical value for NR. Enter a 1-digit hexadecimal number representing a 4-digit binary number in which the highest-order digit is 0 (because there are only 3 bits in the N(R)).

TABLE 35-2
FRAME-TYPE SELECTIONS ON MESSAGE-ENTRY MENUS

TYPE Selection	Definition	Bit Pattern							
		8	7	6	5	4	3	2	1
USE RIGHT CURSOR ARROW TO START HERE									
INFO	INFOrmation	X	X	X	P	X	X	X	0
RR	Receiver Ready	X	X	X	P/F	0	0	0	1
RNR	Receiver Not Ready	X	X	X	P/F	0	1	0	1
REJ	REJect	X	X	X	P/F	1	0	0	1
SREJ	Selective REJect	X	X	X	P/F	1	1	0	1
SARM	Set Asynchronous Response Mode	0	0	0	F	1	1	1	1
SABM	Set Asynchronous Balanced Mode	0	0	1	P	1	1	1	1
DISC	DISConnect	0	1	0	P	0	0	1	1
UA	Unnumbered Acknowledgment	0	1	1	F	0	0	1	1
FRMR	FRaMe Reject	1	0	0	F	0	1	1	1
TEST	link TEST	1	1	1	P/F	0	0	1	1
XID	eXchange station ID	1	0	1	P/F	1	1	1	1
SNRM	Set Normal Response Mode	1	0	0	P/F	0	0	1	1
OTHER 00	User-defined frame type	Enter hexadecimal equivalent of bit pattern desired by writing over 00.							
USE LEFT CURSOR ARROW TO START HERE									

TABLE 35-3

SELECTIONS ENABLED BY FRAME-TYPE SELECTIONS ON MESSAGE-ENTRY MENUS

Frame Type	NR	P/F	NS
INFO	AUTO, 0	0, 1	AUTO, LAST REC NR, SKIP, 0
RR	AUTO, 0	0, 1	--
RNR	AUTO, 0	0, 1	--
REJ	AUTO, 0	0, 1	--
SREJ	--	--	--
SARM	--	--	--
SABM	--	--	--
DISC	--	--	--
UA	--	--	--
FRMR	--	--	--
TEST	--	--	--
XID	--	--	--
SNRM	--	--	--
OTHER 00	--	--	--

TABLE 35-4

PACKET-TYPE SELECTIONS ON MESSAGE-ENTRY MENUS

TYPE Selection	Definition	Bit Pattern
		8 7 6 5 4 3 2 1
USE RIGHT CURSOR ARROW TO START HERE		
DATA	DATA	X X X M X X X 0
RR	Receiver Ready	X X X 0 0 0 0 1
RNR	Receiver Not Ready	X X X 0 0 1 0 1
REJECT	REJECT	X X X 0 1 0 0 1
INTERRUPT	INTERRUPT	0 0 1 0 0 0 1 1
INT CONF	INTerrupt CONFirm	0 0 1 0 0 1 1 1
DIAGNOSTIC	DIAGNOSTIC	1 1 1 1 0 0 0 1
OTHER 00	User-defined frame type	Enter hexadecimal equivalent of bit pattern desired by writing over 00
RESTART CONF	RESTART CONFirm	1 1 1 1 1 1 1 1
RESTART REQ	RESTART REQuest	1 1 1 1 1 0 1 1
RESET CONF	RESET CONFirm	0 0 0 1 1 1 1 1
RESET IND	RESET INDication	0 0 0 1 1 0 1 1
CLEAR CONF	CLEAR CONFirm	0 0 0 1 0 1 1 1
CLEAR REQ	CLEAR REQuest	0 0 0 1 0 0 1 1
CALL ACC	CALL ACCept	0 0 0 0 1 1 1 1
CALL REQUEST	CALL REQUEST	0 0 0 0 1 0 1 1
USE LEFT CURSOR ARROW TO START HERE		

The number entered will be sent each time. If you select this field but don't enter an NR, the default entry 0 (zero) will be sent. If a specific N(R) is sent using this selection, then that N(R) will be the next received N(S) that is expected.

(d) P/F Bit. The P/F field is present only for certain TYPE selections (see Table 35-3). Select 1 or 0 for the poll/final bit. The P/F bit defaults to 0.

(e) NS (Send Sequence Count). This is a window selection field with four selections: AUTO, LAST REC NR, SKIP, and a data-entry field. The default choice is AUTO. If you select AUTO, then the N(S) count will always increment by one with each frame sent unless the message is aborted.

If you select LAST REC NR, the 4600 will send the value of the last N(R) that was received in sequence and in a block with a good BCC. This can be used to respond to a REJECT.

SKIP forces N(S) errors by causing the N(S) count to increment by 2.

If you enter a numerical value for N(S), that number will be sent each time. Enter a 1-digit hexadecimal number representing a 4-digit binary number in which the highest-order digit is 0 (because there are only 3 bits in the N(R)). The default value 0 (zero) will be sent if you select this field but do not enter a number. If a specific N(S) is sent, then the next N(S) will be that N(S) plus 1 if AUTO is used.

35.6 PACKET DEFINITION FIELDS

NOTE: When the DDCMP software option (Option 24) is installed, the Packet Definition fields and automatic LCN handling are not available.

Packet protocol selections appear on the Message-Entry menus only for either of the two X.25 Format choices on the Parameters 1 menu. Figure 35-2 is the default menu for this configuration. The 4600 can handle sequence counts -- modulo 8 only -- for as many as six LCNs selected on the Message-Entry menus.

NOTE: Sequence counts for an LCN will be reset automatically only when that LCN is taken off the active LCN list (see Section 35.9). To take down a call, for example, without inactivating the LCN select 0 for P(S) and P(R).

(a) Q and D Bits. Select the correct pattern of values for the first two bits in the packet.

NOTE: The 4600 transmits modulo 8 packets only.

(b) Logical Channel Number. Enter the LCN as a three-digit hexadecimal number.

(c) Packet Type. This is a rotating window field of 16 selections. Use the left cursor arrow for quickest access to the packet types needed to set up a call; the right cursor arrow for other packet types. Table 35-4 lists the selections and shows the bit sequence that will be transmitted by the 4600 for each selection.

TABLE 35-5
SELECTIONS ENABLED BY PACKET-TYPE SELECTIONS ON MESSAGE-ENTRY MENUS

Packet Type	PR	M	PS
DATA	AUTO, 0	0, 1	AUTO, LAST REC PR, SKIP, 0
RR	AUTO, 0	--	--
RNR	AUTO, 0	--	--
REJECT	AUTO, 0	--	--
INTERRUPT	--	--	--
INT CONF	--	--	--
DIAGNOSTIC (See Note 1.)	--	--	--
OTHER 00	--	--	Enter hexadecimal equivalent of bit pattern desired by writing over 00.
RESTART CONF	--	--	--
RESTART REQ (See Note 1.)	--	--	--
RESET CONF	--	--	--
RESET IND (See Note 1.)	--	--	--
CLEAR CONF	--	--	--
CLEAR REQ (See Note 1.)	--	--	--
CALL ACC (See Note 1.)	--	--	--
CALL REQUEST (See Note 1.)	--	--	--

NOTE 1. When this packet TYPE is selected, a list of selections for the following byte or bytes is presented. See Table 35-6 for a list of these selections.

Table 35-5 shows which of three fields will be displayed on the next line for each packet TYPE selection. Table 35-6 lists and defines further selections that result from various packet TYPE selections.

(d) PR (Receive Sequence Count). This is a window field with two selections. AUTO is the default selection. If you select AUTO, then the P(R) sent will be the last good received P(S) incremented by 1. The received P(S) is good if it is received in sequence and in a block with a good block check. The 4600 will not increment the P(R) count until a good P(S) is received.

The alternative selection in the window is a data-entry field in which you may enter a numerical value for PR. Enter a 1-digit hexadecimal number representing a 4-digit binary number in which the highest-order digit is 0 (because there are only 3 bits in the P(R)).

The number entered will be sent each time. If you select this field but don't enter a P(R), the default entry 0 (zero) will be sent. If a specific P(R) is sent using this selection, then that P(R) will be the next received P(S) that is expected.

(e) More Data Bit. The M field is present only when DATA packet has been selected in the TYPE field (see Table 35-5). The default selection is 0.

(f) PS (Send Sequence Count). This is a window selection field with four selections: AUTO, LAST REC PR, SKIP, and a data-entry field. The default choice is AUTO. If you select AUTO, then the P(S) count will always increment by one with each frame sent unless the message is aborted.

If you select LAST REC PR, the 4600 will send the value of the last P(R) that was received in sequence and in a block with a good block check. This can be used to respond to a REJECT.

SKIP forces P(S) errors by causing the P(S) count to increment by 2.

If you enter a numerical value for PS, that number will be sent each time. Enter a 1-digit hexadecimal number representing a 4-digit binary number in which the highest-order digit is 0 (because there are only three bits in the P(R)). The default value 0 (zero) will be sent if you select this field but do not enter a number.

TABLE 35-6

SELECTIONS FOR BYTES FOLLOWING PACKET-TYPE IDENTIFIER

Packet Type	Ensuing Selection	Data Sent by 4600	Notes
DIAGNOSTIC	DIAG CODE	2-byte data-entry field	Sent following packet-type identifier.
	DIAG EXPL	11-byte data-entry field	Sent following packet-type identifier
RESTART REQ	CAUSE BYTE		
	NETWORK CONGESTION	0000 0001	Sent following packet-type identifier.
	NETWORK OPERATIONAL	0000 0011	Sent following packet-type identifier.
	OTHER 00	Two-digit hexadecimal field	Sent following packet-type identifier.
	DIAGNOSTIC	14-byte data-entry field	Sent following RESTART REQuest cause byte.

(continued)

TABLE 35-6 (cont.)

Packet Type	Ensuing Selection	Data Sent by 4600	Notes
RESET IND	CAUSE BYTE		
	OUT OF ORDER	0000 0001	Sent following packet-type identifier.
	REMOTE PROCEDURE ERROR	0000 0011	Sent following packet-type identifier.
	LOCAL PROCEDURE ERROR	0000 0101	Sent following packet-type identifier.
	NETWORK CONGESTION	0000 0111	Sent following packet-type identifier.
	REMOTE DTE OPERATIONAL	0000 1001	Sent following packet-type identifier.
	NETWORK OPERATIONAL	0000 1111	Sent following packet-type identifier.
	INCOMPATIBLE DESTINATION	0001 0001	Sent following packet-type identifier.
	OTHER 00	Two-digit hexadecimal field	Sent following packet-type identifier.
	DIAGNOSTIC	14-byte data-entry field	Sent following the RESET INDication CAUSE byte.

(continued)

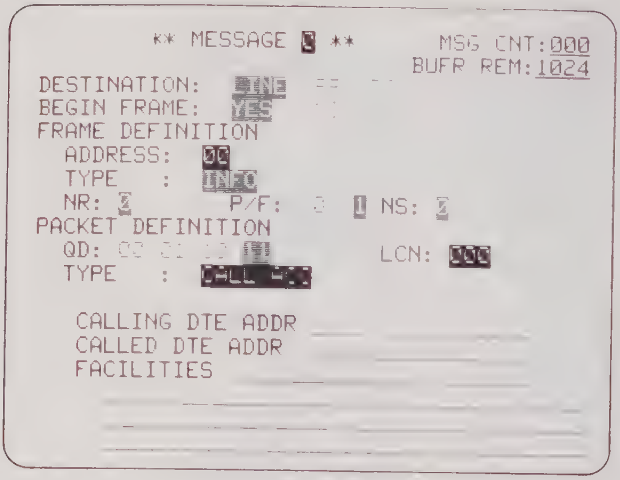
TABLE 35-6 (cont.)

Packet Type	Ensuing Selection	Data Sent by 4600	Notes
CLEAR REQ	CAUSE BYTE		
	NUMBER BUSY	0000 0001	Sent following packet-type identifier.
	OUT OF ORDER	0000 1001	Sent following packet-type identifier.
	REMOTE PROCEDURE ERROR	0001 0001	Sent following packet-type identifier.
	REVERSE CHARGE NOT ACCEPTED	0001 1001	Sent following packet-type identifier.
	INCOMPATIBLE DESTINATION	0010 0001	Sent following packet-type identifier.
	FAST SELECT NOT ACCEPTED	0010 1001	Sent following packet-type identifier.
	INVALID FACILITY REQUEST	0000 0011	Sent following packet-type identifier.
	ACCESS BARRED	0000 1011	Sent following packet-type identifier.
	LOCAL PROCEDURE ERROR	0001 0011	Sent following packet-type identifer.
	NETWORK CONGESTION	0000 0101	Sent following packet-type identifier.
	NOT OBTAINABLE	0000 1101	Sent following packet-type identifier.

(continued)

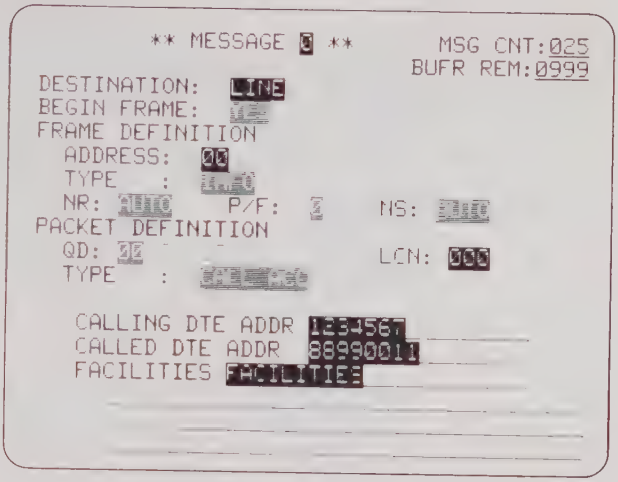
TABLE 35-6 (cont.)

Packet Type	Ensuing Selection	Data Sent by 4600	Notes
CLEAR REQ (cont.)	RPOA OUT OF ORDER	0001 0101	Sent following packet-type identifier.
	OTHER 00	Two-digit hexadecimal field	Sent following packet-type identifier.
CALL ACC	CALLING DTE ADDR	16-byte decimal addr. field	4600 packs the decimal entry and computes count. See text, Section 35.6g.
	CALLED DTE ADDR	16-byte decimal addr. field	4600 packs decimal entry and computes count. See text, Section 35.6g.
	FACILITIES	22-byte alphanumeric field	4600 computes count. Sent following Calling/Called DTE address. See Section 35.6h.
CALL REQUEST	CALLING DTE ADDR	16-byte decimal address field	4600 packs the decimal entry and computes count. See text, Section 35.6g.
	CALLED DTE ADDR	16-byte decimal address field	4600 packs decimal entry and computes count. See text, Section 35.6g.
	FACILITIES	22-byte alphanumeric field	4600 computes count. Sent following Calling/Called DTE address. See text, Section 35.6h.



```
        ** MESSAGE 0 **          MSG CNT:000
                                 BUFR REM:1024
DESTINATION:  LINE
BEGIN FRAME:  YES
FRAME DEFINITION
  ADDRESS:  00
  TYPE    :  INFO
  NR: 0          P/F:  0  1 NS: 0
PACKET DEFINITION
  QD:  00 01 10 11          LCN: 000
  TYPE    :  CALL ACC

   CALLING DTE ADDR
   CALLED DTE ADDR
   FACILITIES
```

Figure 35-8



```
        ** MESSAGE 0 **          MSG CNT:025
                                 BUFR REM:0999
DESTINATION:  LINE
BEGIN FRAME:  YES
FRAME DEFINITION
  ADDRESS:  00
  TYPE    :  INFO
  NR: AUTO       P/F:  0        NS: AUTO
PACKET DEFINITION
  QD: 00                    LCN: 000
  TYPE    :  CALL ACC

   CALLING DTE ADDR 1234567
   CALLED DTE ADDR  88990011
   FACILITIES FACILITIES
```

Figure 35-10

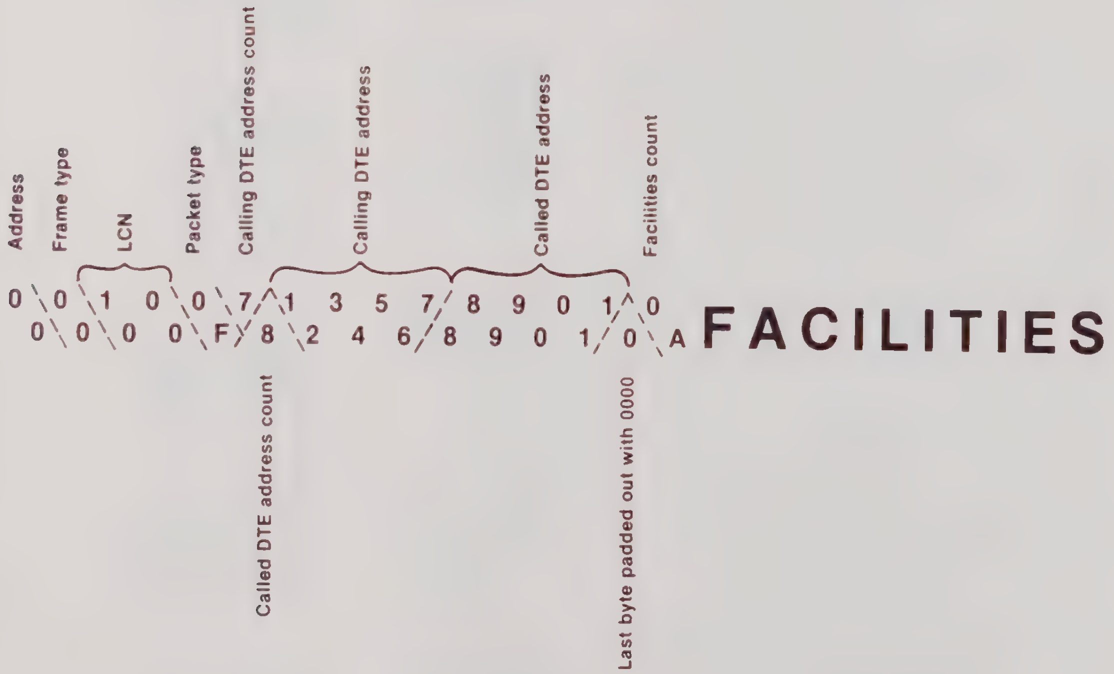


Figure 35-9 Data transmitted by 4600 for CALL ACC entries shown in Figure 35-10.

If a specific P(S) is sent, then the next P(S) will be that P(S) plus 1 if AUTO is used.

(g) Call Request and Call Accept Selections. When either Call Request or Call Accept is selected in the packet TYPE window, three special fields replace the first three Text data-entry lines. These fields are CALLING DTE ADDR, CALLED DTE ADDR, and FACILITIES (see Figure 35-8).

Calling DTE Addr and Called DTE Addr are 16-character decimal fields; enter the addresses of the calling and called DTEs using decimal digits only (other keys are illegal in these two fields). The logic will then convert the two decimal addresses into packed-decimal (Binary-Coded Decimal, BCD) form and insert the correct count byte in accordance with the following algorithm.

The first decimal number entered in the Calling DTE Addr field will be encoded in the four high-order bits of the first Calling address byte to be sent; the second decimal number, in the four low-order digits of that byte; the third decimal number in the four high-order digits of the second byte, and so on. The Called DTE Addr will be encoded after the Calling address in the same fashion, but if the packed decimal Calling address ended with the four high-order binary bits, the Called address will utilize the low-order bits of that byte. If the Called address ends with the high-order portion of a byte, the low-order half of the byte will be packed with 0000. The 4600 will compute the counts for the Calling Addr digits and for the Called Address digits and pack them into a byte to be transmitted before the packed addresses, with the Calling Address count in the high-order bits and the Called Address count in the low-order bits.

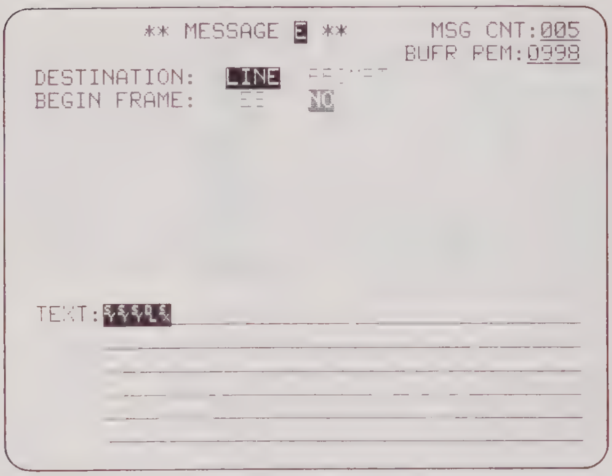
(h) FACILITIES is a 22-byte alphanumeric field. The 4600 sends a FACILITIES count byte after the Called DTE Address, followed by the data in the Facilities field, which is transmitted as ordinary data.

Figure 35-9 shows the data that would be transmitted by the 4600 for the menu entries shown in Figure 35-10.

> NOTE: If no text is entered in one (or more) of these fields, nothing will be transmitted for that field except the count byte (or half-byte) for that field, which will be 0.

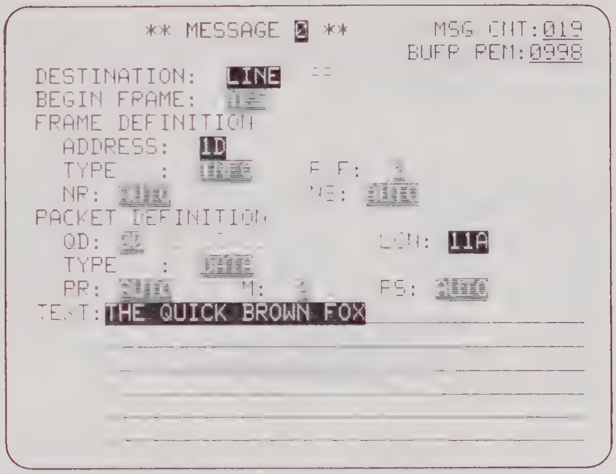
35.7 TEXT ENTRY FIELD

Up to three lines of the text field may be replaced by special data-entry fields resulting from certain packet TYPE selections (see Table 35-6). Otherwise, the Text lines can be used according to the same instructions as for BISYNC or ASYNC format.



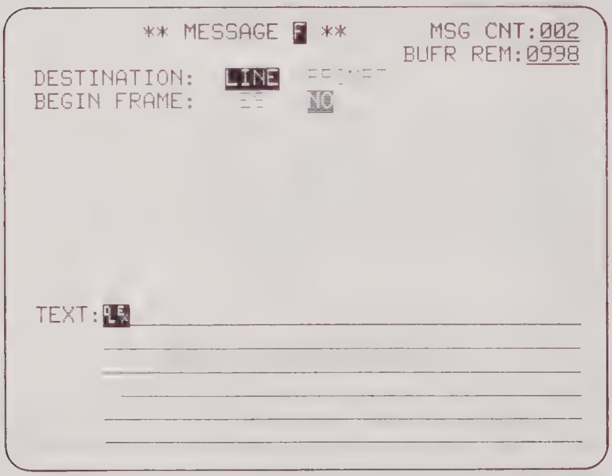
```
        ** MESSAGE E **        MSG CNT:005
                              BUFR REM:0998
DESTINATION:  LINE
BEGIN FRAME:        NO





TEXT:
```

Figure 35-11



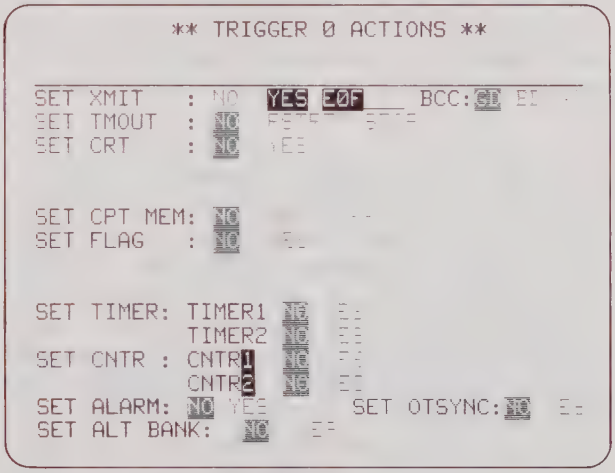
```
        ** MESSAGE 2 **        MSG CNT:019
                              BUFR REM:0998
DESTINATION:  LINE
BEGIN FRAME:
FRAME DEFINITION
  ADDRESS:  1D
  TYPE    :
  NR:
PACKET DEFINITION
  QD:                      LCN: 11A
  TYPE    :
  PR:          M:          FS:
TEXT:THE QUICK BROWN FOX
```

Figure 35-12



```
        ** MESSAGE F **        MSG CNT:002
                              BUFR REM:0998
DESTINATION:  LINE
BEGIN FRAME:        NO





TEXT:
```

Figure 35-13



```
         ** TRIGGER 0 ACTIONS **

SET XMIT    :  NO   YES E0F      BCC:
SET TMOUT   :  NO
SET CRT     :  NO


SET CPT MEM:  NO
SET FLAG    :  NO


SET TIMER:  TIMER1  NO
            TIMER2  NO
SET CNTR :  CNTR1   NO
            CNTR2   NO
SET ALARM:  NO  YES        SET OTSYNC:NO
SET ALT BANK:   NO
```

Figure 35-14

For BISYNC framing (BSC/X.25), enter the leading and trailing protocol characters on separate message-entry menus (Figures 35-11 through 35-13). In this example, DLE ETX could have been added to the Text field of Figure 35-12, but the header always has to be put on a separate menu because Begin Frame: NO must be selected to prevent the header being sent as text within the frame. Then in the Trigger Xmit field frame the message (Figure 35-14) with these leading and trailing menus just as you might for BISYNC format.

For SDLC, enter level 3 protocol bytes in the Text fields.

35.8 STORING PROGRAM PARAMETERS IN PROGRAM MODE

The INTERVIEW 4600 can store a number of the program variables used for interactive testing of X.25 and SDLC networks. This makes it possible to perform a series of tests without having to reestablish a logical session between successive tests. To do this, select MAINTAIN for the Parameters 4 menu selection Lead Status Exiting Run. When the 4600 exits Run Mode all parameters to which the Maintain selection applies will be stored. When the 4600 reenters Run Mode, the test program will initialize, counters and timers will reset, and CRT enhancements will be turned off, but the stored parameters will remain in effect.

The following are the parameters that will be stored when Maintain is selected:

- voltage levels of the static leads controlled by the INTERVIEW;
- the values of N(S) and N(R) (see Section 35.5);
- the Transmit Variable;
- values of P(R) and P(S) for up to six logical channels (the Active LCN List; see Sections 35.6 and 35.9);
- status of the eight trigger flags (Section 18.8).

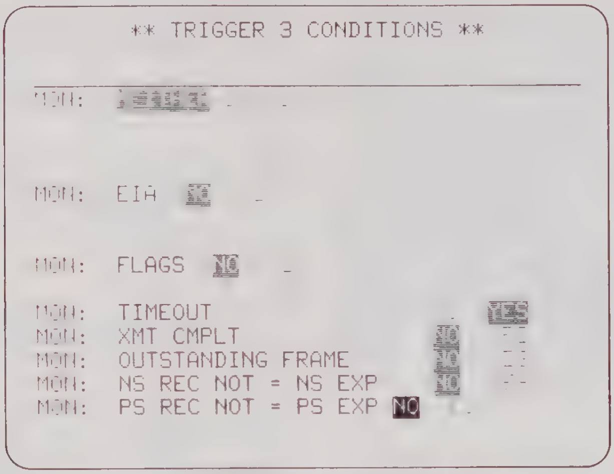
Storing these parameters greatly increases the programming capacity of the 4600. You can write several programs to perform numerous tests. Use the flag mask in a similar fashion in all the programs. When one test is completed, enter Program Mode, load the next program into the INTERVIEW, and continue testing by reentering Run Mode. The unit will resume transmitting starting with the current values of the stored parameters.

NOTE: The 4600 will maintain TD and RD as shown in Table 35-1.

35.9 ACTIVE LOGICAL CHANNEL NUMBER LIST

NOTE: When the DDCMP software option (Option 24) is installed, the Packet Definition fields and automatic LCN handling are not available.

For BSC/X.25 and 7E/X.25, the 4600 can keep track of Receive and Send Sequence Counts for up to six logical channels. To use this capacity effectively you need to understand the 4600's "Active LCN List."



```
            ** TRIGGER 3 CONDITIONS **

MON:   [illegible]


MON:   EIA  NO


MON:   FLAGS  NO

MON:   TIMEOUT                      YES
MON:   XMT CMPLT                 NO
MON:   OUTSTANDING FRAME         NO
MON:   NS REC NOT = NS EXP       NO
MON:   PS REC NOT = PS EXP NO
```

Figure 35-15

An LCN cannot be added to or stay on the active LCN list unless it is currently specified in the Packet Definition portion of a message-entry menu. Furthermore, only an LCN on a message-entry menu specified in the Trigger Xmit action field can be added to the active list. The active LCN list is determined by trigger use and sequencing. It is maintained in Program Mode if MAINTAIN is selected for Lead Status Exiting Run on the Parameters 4 menu. Otherwise, the active LCN list is cleared and the packet sequence counts are reset when the 4600 enters Run Mode.

If MAINTAIN is selected, each time the 4600 enters Run Mode it checks the active LCN list against the LCNs entered on the message-entry menus.

If an LCN on the active list has been removed from a Message-Entry menu (by replacing the LCN value on the menu with 000), it is removed from the active LCN list when the 4600 enters Run Mode. This is the only way to remove an LCN from the active list. Removing a message containing an LCN from the trigger Xmit field does not remove that LCN from the active LCN list.

Once an LCN is removed from the active list, its sequence counts are reset to zero, so the correct sequence cannot be regained by reinstating the LCN to the active list.

If there are more than six LCNs specified in the messages entered in trigger Xmit fields, the 4600 will select six active LCNs in accordance with the rules for processing of triggers given in Section 21.1. If triggers are configured to send a seventh LCN, it will not be added to the active LCN list and the program probably will not run correctly.

NOTE: LCN 000 is always available, but it is not counted as one of the six active LCNs.

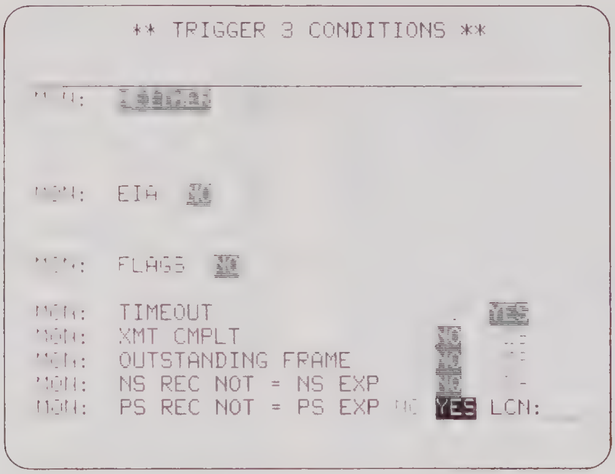
When MAINTAIN is selected all P(R) and P(S) values from the LCN active list will be stored whenever the PROG key is depressed. If you do not want to change the active list, do not remove any active LCNs from the message menus. If you want to take any LCNs off the active list, remove them from the message menus. If you want to add an LCN to the list, add it to a message menu and specify that message menu in the trigger Xmit field. To prevent confusion, there should never be more than six LCNs on the message menus at a time. It is not necessary for triggers to transmit an LCN for it to stay on the active list. As long as it is not removed by taking it off the message menu and its P(R) and P(S) values are not reset by selecting RESET for Lead Status Exiting Run, it will remain active and its status will be preserved.

35.10 SPECIAL TRIGGER SELECTIONS

35.10.1 Outstanding Frame Condition

This selection (Figure 35-15) appears on Line 15 of the trigger Conditions menus when BSC/X.25, 7E/X.25, SDLC, or SDLC/NRZI has been selected on the Parameters 1 menu. The default choice is NO. Select YES if you want a trigger action whenever there is an outstanding frame.

When the 4600 transmits an information frame in X.25 or SDLC mode, the internal outstanding frame flag is set until that frame is acknowledged. Once the frame is acknowledged the outstanding frame flag is reset. OUTSTANDING FRAME must be used with another condition that selects when it is to be tested -- usually a string search or timeout. For instance, you could set a timeout to start when the 4600 transmits a frame and set a trigger to resend the frame if there is an outstanding receive frame at timeout.



```
            ** TRIGGER 3 CONDITIONS **
________________________________________________
MON:  [illegible]


MON:  EIA  NO


MON:  FLAGS  NO

MON:  TIMEOUT                          YES
MON:  XMT CMPLT                     NO
MON:  OUTSTANDING FRAME             NO
MON:  NS REC NOT = NS EXP           NO
MON:  PS REC NOT = PS EXP NO  YES  LCN:
```

Figure 35-16

35.10.2 NS Rec Not = NS Exp Condition

This field (Figure 35-15) appears on Line 16 of the trigger Conditions menus only for BSC/X.25, 7E/X.25, SDLC, and SDLC/NRZI. It is true when the Number Sent Count Received does not equal the Number Sent Count Expected. The default choice is NO.

In X.25 and SDLC modes, the 4600 is constantly monitoring the received N(S) count, which should always increment by 1. If the Received N(S) count sequence is, for example, 0, 1, 2, 4, 5, then this trigger condition will be true when the frame with N(S) = 4 is received. This condition can be used to send a REJ frame.

NOTE: A block is not considered received until the entire frame is received with a good BCC. Thus, if the Received N(S) count sequence is 0, 1, 2, 3, 4, but frame 2 is received with a bad BCC, this condition will be true when frame 3 is received with a good BCC.

35.10.3 PS Rec Not = PS Exp Condition

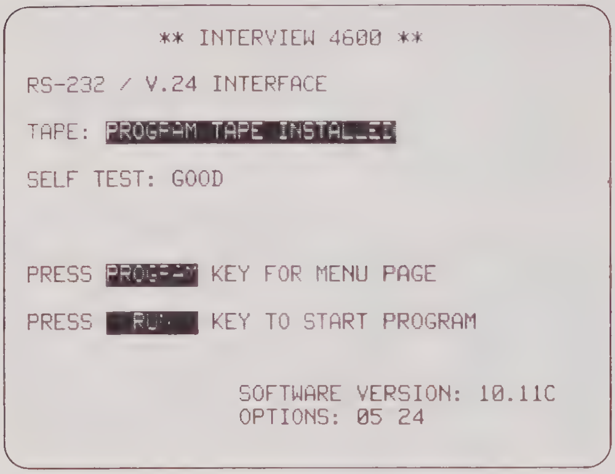
NOTE: When the DDCMP software option (Option 24) is installed, this trigger condition is not available.

This field (Figure 35-15) is displayed on Line 17 of the trigger conditions menu for BSC/X.25 or 7E/X.25. The logic monitors for this condition using the same rules as for NS Rec Not = NS Exp. For this condition also, a packet is not considered received until the entire frame is received with a good BCC.

When YES is selected for this condition (Figure 35-16, a three-digit LCN field comes up. Enter the three-digit hexadecimal LCN (without the HEX key). If no LCN is entered, the logic will look for LCN 000.

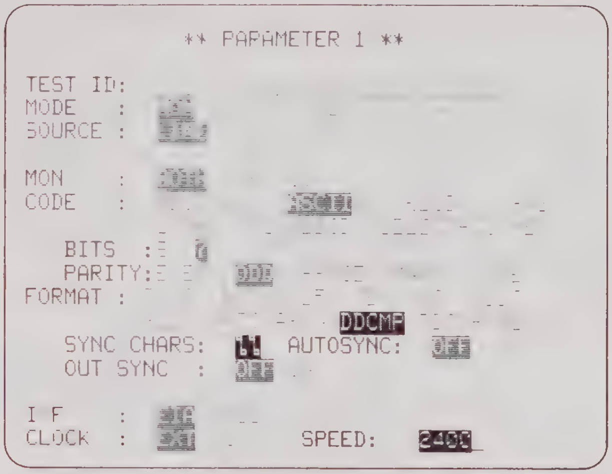
35.10.4 Transmit Variable Action

The 4600 has a Variable Counter that is controlled by the trigger Set Xmt Var action. See Section 30.7 for instructions on how to include this counter's 1-byte output in a transmission.



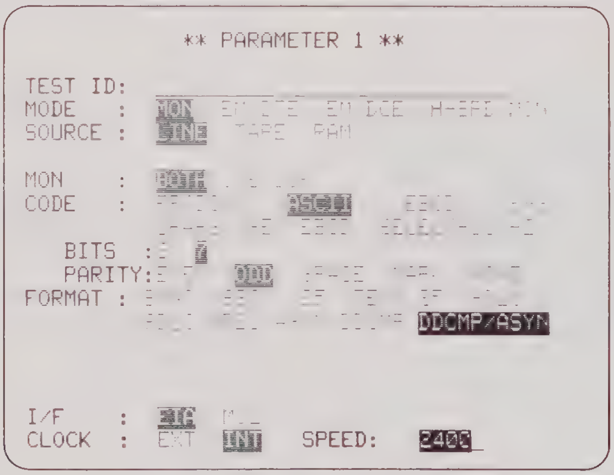
```
** INTERVIEW 4600 **

RS-232 / V.24 INTERFACE

TAPE: PROGRAM TAPE INSTALLED

SELF TEST: GOOD


PRESS PROGRAM KEY FOR MENU PAGE

PRESS  RUN    KEY TO START PROGRAM

                SOFTWARE VERSION: 10.11C
                OPTIONS: 05 24
```

Figure 36-1 DDCMP is Option 24



```
** PARAMETER 1 **

TEST ID:
MODE   :
SOURCE :

MON    :
CODE   :           ASCII

   BITS  :
   PARITY:      ODD
FORMAT :
                          DDCMP
   SYNC CHARS:      AUTOSYNC:
   OUT SYNC  :

I F    :
CLOCK  :              SPEED:    2400
```

Figure 36-2 DDCMP Format allows choice of SYNC CHARacterS, AUTOSYNCC, and OUTSYNC.



```
** PARAMETER 1 **

TEST ID:
MODE   : MON  EM DTE  EM DCE
SOURCE : LINE  TAPE  RAM

MON    : BOTH
CODE   :           ASCII

   BITS  :   7
   PARITY:      ODD
FORMAT :
                               DDCMP/ASYN


I/F    :
CLOCK  : EXT  INT   SPEED:    2400
```

Figure 36-3 DDCMP/ASYNC Format allows no SYNC selections.

36
DDCMP (OPT-24)

36.1 PARAMETERS 1 MENU SELECTIONS

Option 24 enables the INTERVIEW 4600 to support Digital Equipment Corporation's Digital Data Communication Message Protocol (DDCMP). To be sure your 4600 has Option 24, check the installed options listed on the power-up screen (Figure 36-1).

36.1.1 Format

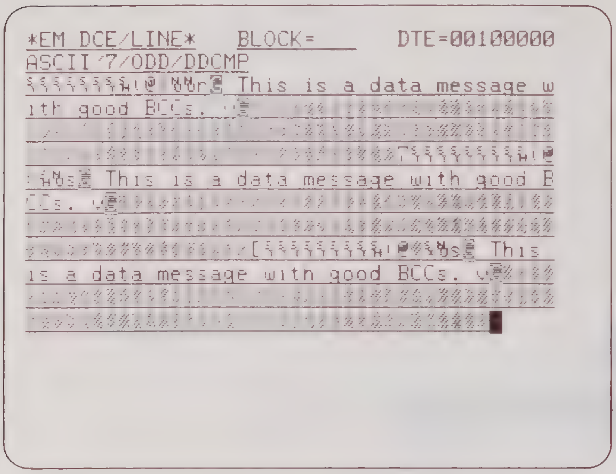
With the DDCMP option, you may select on the Parameter 1 menu either DDCMP or DDCMP ASYNC for the data format. When DDCMP is selected, you may choose SYNC CHARacterS, AUTOSYNC, and OUTSYNC (Figure 36-2). The default synchronization character is 96 (hex). When DDCMP ASYNC is selected, the SYNC CHARS, AUTOSYNC, and OUTSYNC selections disappear (Figure 36-3).

> NOTE: If you first set the FORMAT then change the CODE on the Parameter 1 menu, the SYNC CHARacterS may also change. To prevent this, always work down the menu, setting the CODE first, then the FORMAT.

36.1.2 Autosync and Outsync

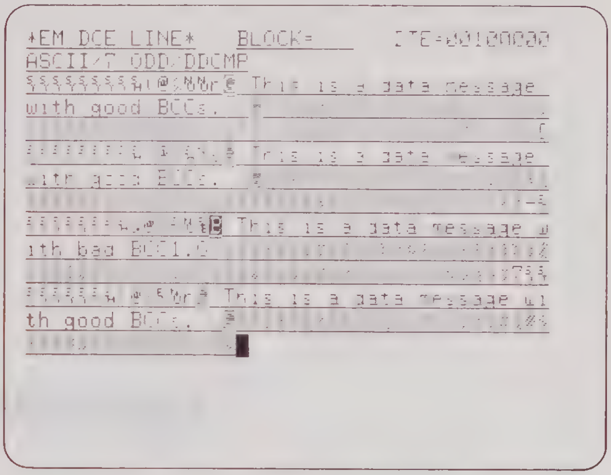
AUTOSYNC enables you to suppress display of synchronization characters outside of messages in DDCMP. This is especially useful for lines which idle with SYN characters, or which insert trailing SYN characters at the end of a message. When AUTOSYNC is on, SYN characters outside of messages will not be displayed. However, if any other characters occur outside of messages, they will appear on the CRT. (All characters will be recorded and tested by the 4600's Trigger logic, whether or not AUTOSYNC is on or off.) The technical note in Section 36.2 explains exactly how AUTOSYNC and OUTSYNC function.

OUTSYNC forces the 4600's receivers out of synchronization at the end of a message or following a header that has a bad block check. This enables you to suppress idle characters other than SYN from the display between messages. If you wish to display all data, including idle and SYN characters, leave both AUTOSYNC and OUTSYNC off.



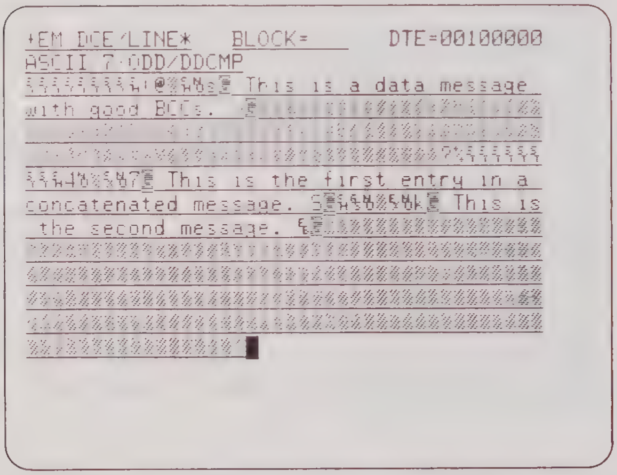
```
*EM DCE/LINE*    BLOCK=          DTE=00100000
ASCII/7/ODD/DDCMP
              This is a data message w
ith good BCCs.
  This is a data message with good B
CCs.
                                     This
is a data message with good BCCs.
```

Figure 36-4 Repeating data message with good BCCs. AUTOSYNC OFF; OUTSYNC OFF.



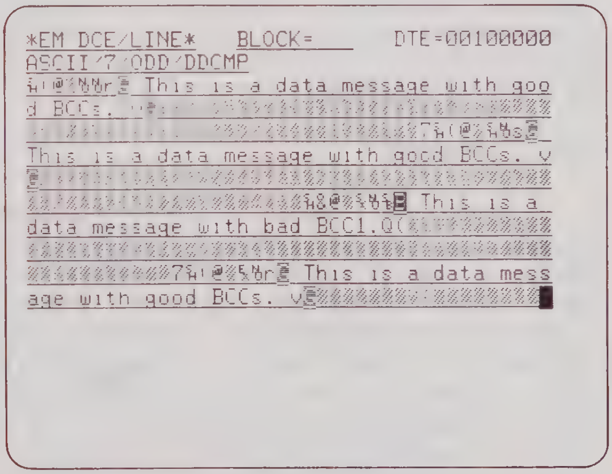
```
*EM DCE LINE*    BLOCK=          DTE=00100000
ASCII/7 ODD/DDCMP
              This is a data message
with good BCCs.
            This is a data message
with good BCCs.
            This is a data message w
ith bad BCC1.
            This is a data message wi
th good BCCs.
```

Figure 36-5 Good data messages followed by a message with a bad BCC1. AUTOSYNC OFF; OUTSYNC OFF.



```
*EM DCE/LINE*    BLOCK=          DTE=00100000
ASCII/7/ODD/DDCMP
              This is a data message
with good BCCs.
          This is the first entry in a
concatenated message.          This is
 the second message.
```

Figure 36-6 Good data message followed by a concatenated message. AUTOSYNC OFF; OUTSYNC OFF.



```
*EM DCE/LINE*    BLOCK=          DTE=00100000
ASCII/7/ODD/DDCMP
        This is a data message with goo
d BCCs.
This is a data message with good BCCs. v
                                This is a
data message with bad BCC1.Q(
                        This is a data mess
age with good BCCs. v
```

Figure 36-7 Same setup as Fig. 36-5. AUTOSYNC ON; OUTSYNC OFF.

36.2 OUTSYNC AND AUTOSYNC (TECHNICAL NOTES)

36.2.1 Autosync Off; Outsync Off (Default Selections)

When the 4600 receives a string of SYN characters, it uses the first two for synchronization, and does not display them. All subsequent SYN characters are displayed.

(a) Consider first the case of a single (nonconcatenated) data message with good block checks (Figure 36-4). The 4600 synchronizes on the first two SYN characters, so the first two SYN characters are not displayed. The synchronization logic then turns off, and all subsequent characters are displayed, until the end of the message. After the final block check, the synchronization logic turns back on and the 4600 continues to display data or the idle line state.

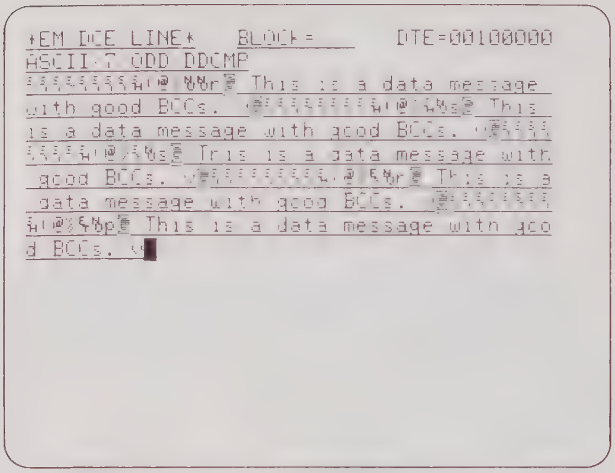
(b) Now consider the case of a data message with a bad block check after the header field (Figure 36-5). When the 4600 encounters the bad block check, it starts searching for the synchronization sequence, but continues to display data. If it encounters SYN SYN in the data portion of the message, it will resynchronize. The first two SYN characters will not be displayed unless the SYN characters are "in phase" with the data, in which case one SYN character will be displayed. If the first non-SYN character is not a DLE, SOH or ENQ, the synchronization search resumes, and the data display also continues. However, the rest of the data may be skewed. This process will repeat until a valid header is found.

NOTE: If a block check is bad for a control or data field, the automatic frame locator may be unable to find the start of the message, or the start of the subsequent messages.

(c) In the case of concatenated blocks (Figure 36-6), the 4600 does not automatically try to resynchronize at the end of the message. When the 4600 sees the Q bit set to 0, it looks at the character immediately following the final block check. If the character is an SOH, ENQ, or DLE -- meaning the next message is beginning -- the INTERVIEW does not resynchronize. Instead, it continues to display data normally. If, however, it sees any other character, it starts looking for the synchronization pattern again. Subsequent data may be skewed until a synchronization pattern is found.

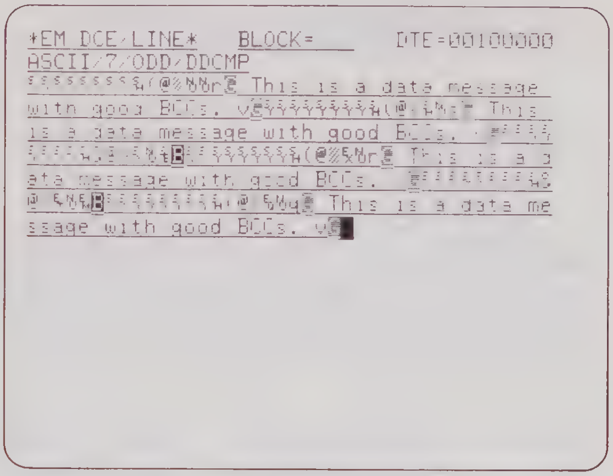
36.2.2 Autosync On

When AUTOSYNC is turned ON, the 4600 leaves the synchronization logic on, even though it has encountered the first SYN SYN pattern. This means that SYN characters following the first SYN SYN are not displayed. When the unit encounters any other character, it turns off the synchronization logic and displays that character. The synchronization logic is turned off during messages, so AUTOSYNC will not suppress SYNs if they occur inside a message (either in the header or data field). Figure 36-7 depicts the same setup as Figure 36-6, but with AUTOSYNC ON. Note that the synchronization characters are now suppressed.



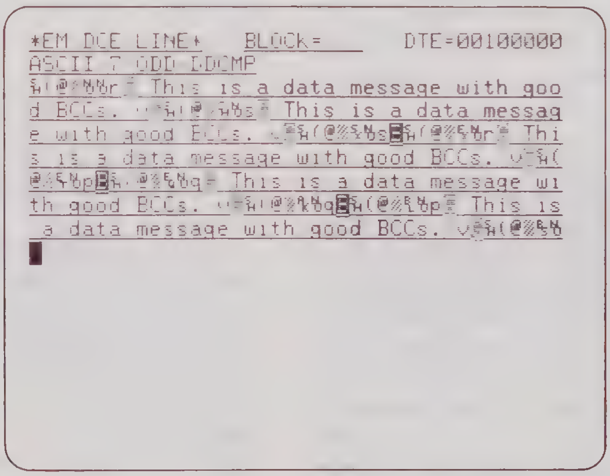
```
*EM DCE LINE*   BLOCK=        DTE=00100000
ASCII/7/ODD/DDCMP
SSSSSSSSSH(@ NNUr≡ This is a data message
with good BCCs. v≡SSSSSSSSSH(@ ENUs≡ This
is a data message with good BCCs. v≡SSSS
SSSSH(@%ENUs≡ This is a data message with
 good BCCs. v≡SSSSSSSSSH(@ ENUr≡ This is a
 data message with good BCCs. v≡SSSSSSSSS
H(@%ENUp≡ This is a data message with goo
d BCCs. v█
```

Figure 36-8 Same setup as Fig. 36-4. AUTOSYNC OFF; OUTSYNC ON.



```
*EM DCE/LINE*   BLOCK=        DTE=00100000
ASCII/7/ODD/DDCMP
SSSSSSSSSH(@%NNUr≡ This is a data message
with good BCCs. v≡YYYYYYYYYYH(@ ENUs≡ This
is a data message with good BCCs. v≡SSSS
SSSSH(@ ENUt█SSYYYYYYYYH(@%ENXr≡ This is a d
ata message with good BCCs. ≡SSSSSSSSSH@
@ ENEM█SSSSSSSSSH(@ ENUq≡ This is a data me
ssage with good BCCs. v≡█
```

Figure 36-9 Same setup as Fig. 36-5. AUTOSYNC OFF; OUTSYNC ON.



```
*EM DCE LINE*   BLOCK=        DTE=00100000
ASCII/7/ODD/DDCMP
SH(@%NNUr≡ This is a data message with goo
d BCCs. v≡SH(@%SNUs≡ This is a data messag
e with good BCCs. v≡SH(@%SNXs█SH(@%ENYr≡ Thi
s is a data message with good BCCs. v≡SH(
@%ENYp█SH(@%ENUq≡ This is a data message wi
th good BCCs. v≡SH(@%ANKq█SH(@%ENIp≡ This is
 a data message with good BCCs. v≡SH(@%ENSO
█
```

Figure 36-10 Same setup as Figs. 36-9 and 36-5. AUTOSYNC ON; OUTSYNC ON.

36.2.3 Outsync On

As explained in Section 36.2.1, when OUTSYNC is OFF, the 4600 continues to display data between messages even though it is actively looking for a synchronization pattern. This means that when an extra bit, or bits, or a bad block check appears on the line, data may be skewed until the next synchronization pattern is found.

If OUTSYNC is turned ON, the 4600 forces its receivers out of synchronization and thus stops displaying data when it encounters the end of a message block. Data is not displayed again until the next synchronization pattern is found.

(a) The OUTSYNC logic looks at the Q flag of the message. If the Q flag is 1 (meaning a nonconcatenated message), the 4600 will go out of synchronization immediately after the final block check. The setup for Figure 36-8 is identical to that used for Figure 36-4, except OUTSYNC is turned ON. All idle characters between messages are suppressed in Figure 36-8, but those in the header message remain.

(b) After a bad block check (either BCC1 or, in data and MOP messages, BCC2), the 4600 will automatically go out of synchronization and display will cease until the next synchronization pattern is found. The setup for Figure 36-9 is identical to that used for Figure 36-5, except OUTSYNC is turned ON. In Figure 36-9 the messages which follow the bad BCCs are not displayed because the 4600 has gone out of synchronization.

(c) If the Q flag is 0, the 4600 expects another message immediately following the final block check character. If the character after the block check is anything except SOH (for data messages), ENQ (for control messages), or DLE (for maintenance messages), the 4600 goes out of synchronization and stops display.

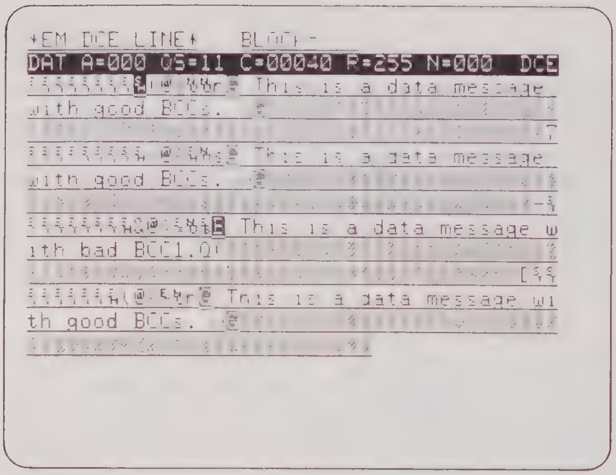
This means that, when OUTSYNC is ON, if a character or even an extra bit occurs between concatenated messages, the second message will not be displayed unless the second message is preceded by at least two SYN characters.

36.2.4 Autosync On; Outsync On

When both AUTOSYNC and OUTSYNC are ON, the logic of both functions are applied to the displayed data, as shown in Figure 36-10. The setup is identical to that used for Figures 36-9 and 36-5 except both AUTOSYNC and OUTSYNC are ON. In Figure 36-10 synchronization and idle characters between messages are suppressed and data following the bad BCCs is not displayed until the next synchronization pattern is found.

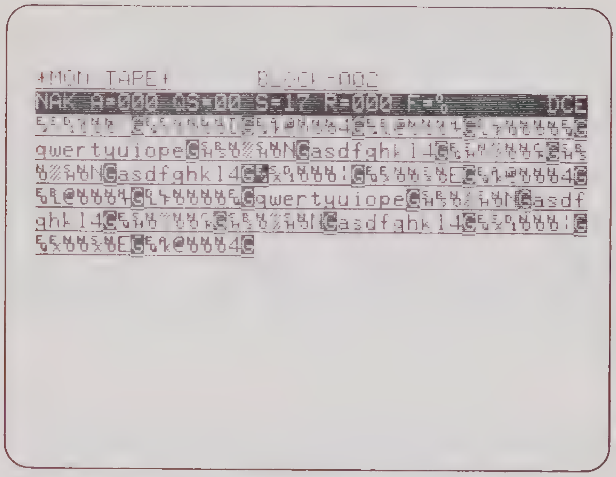
36.3 PARAMETER 2 MENU SELECTIONS

As with Bit-Oriented Protocols, you may select single-line, dual-line, or frame display for DDCMP formats on the Parameter 2 menu. Single-line displays DCE and DTE data on one line, with DCE data underlined, for half-duplex data. Dual-line displays DTE data on one line, and underlined DCE data on the line below, with fill symbols maintaining character synchronization between the lines. Frame display shows the expanded header fields of each message. Frame display is explained in Section 36.5.



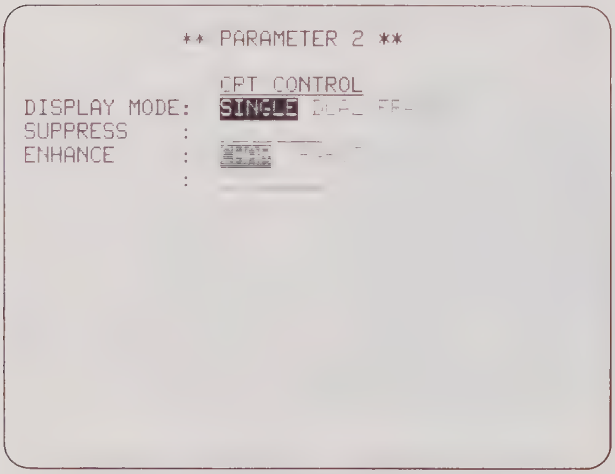
```
*EM DCE LINE*    BLOCK -
DAT A=000 QS=11 C=00040 R=255 N=000  DCE
 This is a data message
with good BCCs.

 This is a data message
with good BCCs.

 This is a data message w
ith bad BCC1.

 This is a data message wi
th good BCCs.
```

Figure 36-11 Expanded DDCMP header for data.



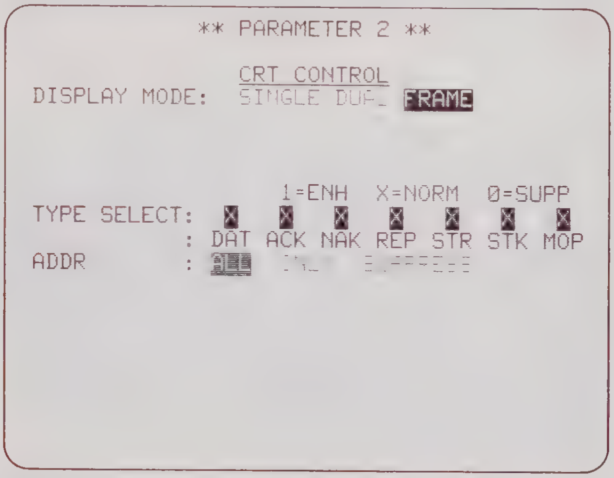
```
*MON TAPE*          BLOCK-002
NAK A=000 QS=00 S=17 R=000 F=%          DCE

qwertyuiope      asdfghkl4
     asdfghkl4
         qwertyuiope        asdf
ghkl4                asdfghkl4
```

Figure 36-12 Expanded DDCMP header for NAK.



```
                ** PARAMETER 2 **

                 CRT CONTROL
DISPLAY MODE:    SINGLE
SUPPRESS     :
ENHANCE      :
             :
```

Figure 36-13 Parameter 2 menu with FRAME Display Mode.



```
                ** PARAMETER 2 **

                 CRT CONTROL
DISPLAY MODE:    SINGLE DUAL FRAME


                     1=ENH   X=NORM   0=SUPP
TYPE SELECT:   X    X    X    X    X    X    X
           :  DAT  ACK  NAK  REP  STR  STK  MOP
ADDR       :  ALL
```

Figure 36-14 Parameter 2 menu with FRAME Mode selected.

When Dual- or Single-line display is selected, you may enhance characters by entering them in the ENHANCE field on the Parameters 2 menu. Do not enter any characters in the SUPPRESS field if you plan to use the automatic header locator. The header locator uses the characters in the CRT buffer, and will not operate correctly if a byte has been suppressed from a header.

36.4 AUTOMATIC HEADER LOCATOR

The INTERVIEW can automatically identify and expand header fields in Manual Freeze mode. Monitor data, using either line or tape as a source. When the CRT buffer is filled, press MANUAL FREEZE. Now press the B key to scroll to the Beginning of the buffer or use the cursor keys to move the cursor to a point before the data of interest.

When you press the F key, the cursor will move to the first character of the next header on the screen. On the second line of the CRT will appear a mnemonic expansion of the header fields. Figure 36-11 shows an example of an expanded DDCMP header. The expansion shows the kind of message (Data, Ack, and so on), the address (A), and the value of the Q and S bits. For Data messages, the expansion also includes the message count (C), response number (R), and the transmit number (N). For control messages (ACK, NAK, REP, STRT, and STACK), the Subtype (S), Response number (R), and Fill bytes (F) are shown. For all control messages other than NAK, the Subtype field should appear as a 00 (hex); however, if there is something other than 00 (hex) in that field of the message, the actual contents of the field will be displayed. For NAKs, the Subtype appears as a decimal number between 00 and 63 (see Figure 36-12). In Maintenance Operation Procedure (MOP) messages, the unused Response and Number fields are designated F (for Fill) and are displayed in hexadecimal.

Table 36-1 lists the abbreviations used in the header expansions.

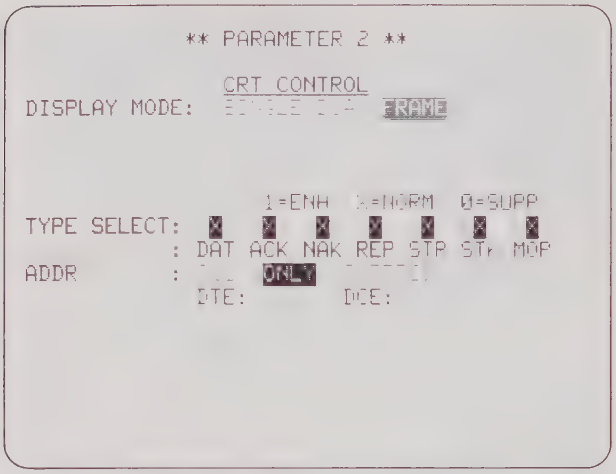
At the end of the expansion on Line 2 is the side of the line on which the frame appears (DTE or DCE). This is helpful in dual-line display when the cursor falls on two headers simultaneously, one DTE header and one DCE header.

36.5 FRAME DISPLAY

If monitoring data from the tape or RAM, you have the option of displaying the DDCMP test results as regular data or in a tabular frame trace format. Selecting FRAME on the Parameters 2 menu selects the frame display.

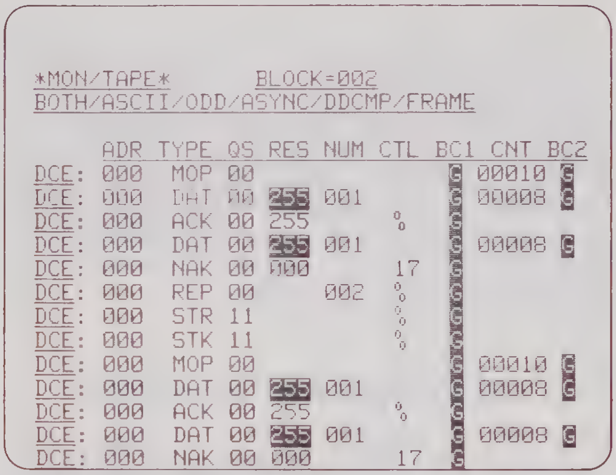
When MON: TAPE or MON: RAM is selected on the Parameter 1 menu, the Parameter 2 menu displays the option FRAME in DISPLAY MODE (Figure 36-13). Selecting FRAME causes the SUPPRESS and ENHANCE fields to disappear and two new fields are shown.

(a) TYPE SELECT. This is a data-entry field that appears upon selection of FRAME (Figure 36-14). Selections in this field include DAT, ACK, NAK, REP, STR, STK, and MOP. The default condition is normal (X) video display of the expansions of the seven selections. Enter 1's for any of the selections to be displayed in low-intensity reverse image. Enter 0's to suppress display of any selections.



```
            ** PARAMETER 2 **

              CRT CONTROL
DISPLAY MODE:             FRAME


                   1=ENH  2=NORM  0=SUPP
TYPE SELECT:  X   X   X   X   X   X   X
            : DAT ACK NAK REP STR STK MOP
ADDR        :      ONLY
               DTE:        DCE:
```

Figure 36-15 Selecting ADDRess ONLY or SUPPRESS displays. DTE and DCE fields.



```
*MON/TAPE*       BLOCK=002
BOTH/ASCII/ODD/ASYNC/DDCMP/FRAME

      ADR TYPE QS RES NUM CTL BC1 CNT BC2
DCE:  000  MOP 00                G 00010 G
DCE:  000  DAT 00 255 001        G 00008 G
DCE:  000  ACK 00 255        %   G
DCE:  000  DAT 00 255 001        G 00008 G
DCE:  000  NAK 00 000        17  G
DCE:  000  REP 00     002    %   G
DCE:  000  STR 11            %   G
DCE:  000  STK 11            %   G
DCE:  000  MOP 00                G 00010 G
DCE:  000  DAT 00 255 001        G 00008 G
DCE:  000  ACK 00 255        %   G
DCE:  000  DAT 00 255 001        G 00008 G
DCE:  000  NAK 00 000        17  G
```

Figure 36-16 Data displayed in the FRAME Mode.

TABLE 36-1
ABBREVIATIONS FOR DDCMP
FRAME DISPLAY AND HEADER FIELD EXPANSIONS

Abbreviation	Meaning
DAT	Data
ACK	Acknowledgment
NAK	Negative Acknowledgment
REP	Reply
STR	Start
STK	Start Acknowledgment
MOP	Maintenance Operation Procedure
A, ADR*	Address
QS	Quicksync and Select flags
C, CNT*	Count
S, CTL*	Subtype (Control field)
R, RES*	Response number
N, NUM*	Message number
F**	Fill

* Entry appears in Frame display.

** Entry appears in Header field expansion in Single- or Dual-line display only.

(b) ADDRess. This selection also appears only when FRAME is selected in the DISPLAY MODE field. There are two fields for this selection. The first line is a data selection field. For the default selection ALL, mnemonic expansions for all traffic are displayed. If you select ONLY, only the traffic for the address entered on the next line (Figure 36-15) will be displayed. SUPPRESS prevents display of the expansions for the address entered on the next line.

On the next line, you may select either DTE or DCE or both by entering the address(es) in which you are interested. Enter the two-digit hexadecimal frame level address in the DTE or DCE entry field or in both.

Each message is labeled DTE or DCE. The expansion of the header (Figure 36-16) shows the ADdRess, the message TYPE, the state of the Q and S flags, RESponse number, transmit NUMber, and a ConTroL field. The message subtype appears in the CTL field for NAKs. For other messages, the field should be 00 (hex); however, if there is something other than 00 (hex) in that field of the message, the actual contents of the field will be displayed.

For data and maintenance messages, the CouNT also appears.

The address, Response number, Transmit number, and count appear as decimal numbers. For NAK type, the CTL display is a decimal number between 00 and 63. For other control messages, the CTL display is in hexadecimal and should normally be 00; however, if there is something other than 00 in that field of the message, the actual contents will be displayed. The QS flags are shown as 0's or 1's. Two columns of the display are for block checks -- BC1, and BC2 for data and maintenance messages. A good block check is indicated by a half-intensity, reverse-image G; a bad block, by a full-intensity reverse-image B.

In messages from the DTE side of the line, the Transmit number is highlighted; in DCE messages, the Respond number is highlighted. This makes it easy to scroll through the CRT buffer and follow the sequence of messages.

36.6 INTERACTIVE OPERATION

In interactive DDCMP operation, the 4600 can compute its own control messages and header fields for data and MOP messages. It can perform block check calculations on both header and data fields.

36.6.1 The Message Menu

In Program mode, press MESSAGE (or ENTER MESSAGE) and 0, to display the menu for Message 0 (Figure 36-17). You may enter all the parameters of a DDCMP message manually, or the 4600 can compute them for you.

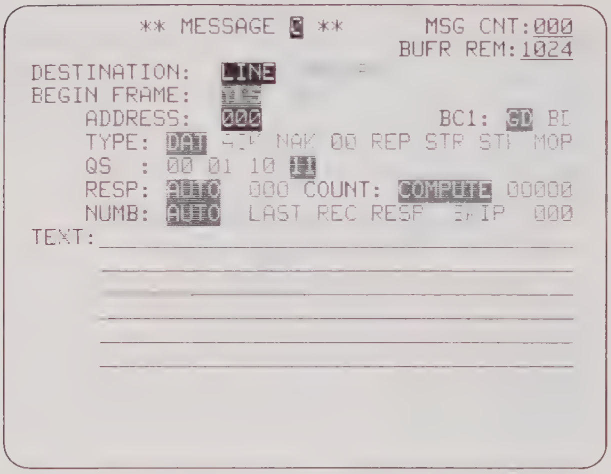
(a) ADDRESS. Enter a decimal number (0 to 255) in this field.

(b) BC1. You may select the first block check sequence (following the header) to be good or bad.

(c) TYPE. You may select any of the available DDCMP message types. If you select NAK, enter the Subtype (reason for NAK) as a decimal number between 00 and 63 in the data-entry field following NAK.

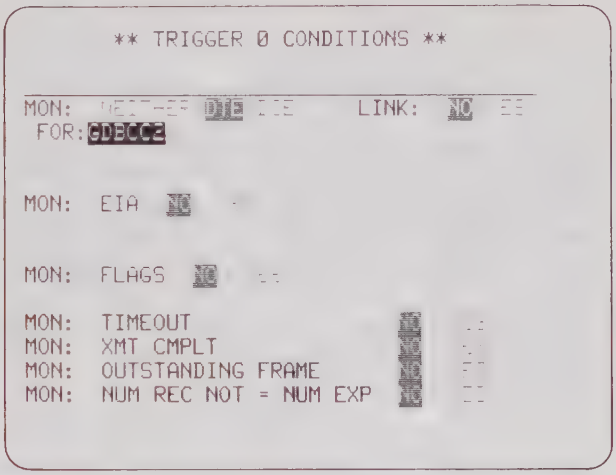
(d) QS. Select the value of the Quicksync and Select flags.

(e) RESPonse. The 4600 automatically keeps track of the Response number in an interactive routine. If you select AUTO, the 4600 will enter the last received message number in the Response field of the message. Alternatively, you may enter any other



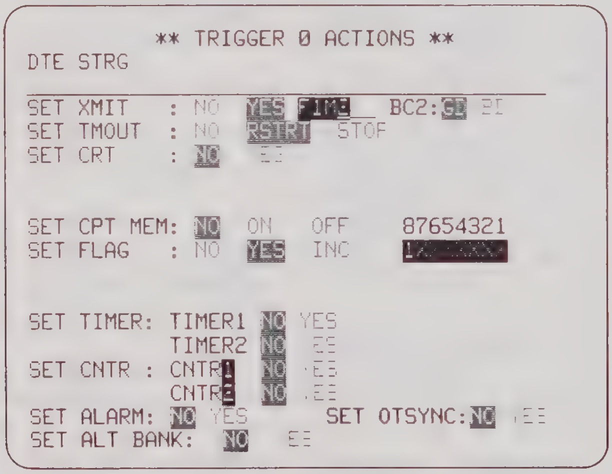
```
      ** MESSAGE 0 **        MSG CNT:000
                            BUFR REM:1024
DESTINATION:  LINE
BEGIN FRAME:  SOH
    ADDRESS:  000               BC1: GD BD
    TYPE: DAT ACK NAK 00 REP STR STK MOP
    QS  : 00 01 10 11
    RESP: AUTO  000 COUNT: COMPUTE 00000
    NUMB: AUTO  LAST REC RESP  SKIP  000
TEXT:___________________________________
```

Figure 36-17 The default Message menu in DDCMP.



```
      ** TRIGGER 0 CONDITIONS **

MON:  NEITHER DTE DCE     LINK:  NO  YES
 FOR:GDBCC2

MON:  EIA  NO  YES

MON:  FLAGS  NO  YES

MON:  TIMEOUT                    NO  YES
MON:  XMT CMPLT                  NO  YES
MON:  OUTSTANDING FRAME          NO  YES
MON:  NUM REC NOT = NUM EXP      NO  YES
```

Figure 36-18 The Trigger Conditions menu allows selection of GDBCC1, GDBCC2, BDBCC1, and BDBCC2 when in DDCMP.



```
        ** TRIGGER 0 ACTIONS **
DTE STRG
________________________________________
SET XMIT   : NO  YES FIM3   BC2:GD BD
SET TMOUT  : NO  RSTRT  STOP
SET CRT    : NO   YES


SET CPT MEM: NO  ON   OFF   87654321
SET FLAG   : NO  YES  INC   1XXXXXXX


SET TIMER: TIMER1 NO YES
           TIMER2 NO YES
SET CNTR : CNTR1  NO YES
           CNTR2  NO YES
SET ALARM: NO YES      SET OTSYNC:NO YES
SET ALT BANK:  NO   YES
```

Figure 36-19 The Trigger Actions menu controls transmission of BCC2. BCC1 is controlled on the Message menu.

decimal number from 0 to 255 in the data-entry field of this selection.

(f) COUNT. The 4600 will compute the count of a data or maintenance message automatically, and enter it in the message header. Alternatively, you may enter your own value here (from 0 to 16383). This field does not appear if a message type other than DAT or MOP is selected.

(g) NUMBer. For data messages, you may select AUTO, letting the 4600 compute the value of this parameter; or SKIP, in which case the 4600 will skip one number in the message sequence; or you may enter a value in the data-entry field.

For REPly messages, the NUMBer field has special meaning. Select LAST RECeived RESPonse for this field in REP messages or enter a specific number to which you wish to force a REPLY.

(h) TEXT. You may enter text for Data or Maintenance messages. This field may be used for sending synchronization characters after Control messages or for manually generating data for special tests.

36.6.2 Block Checks in Transmissions

On the Trigger Conditions menu (Figure 36-18), you may set the trigger to look for GDBCC1, BDBCC1, GDBCC2, or BDBCC2 in addition to the regular selections (STRG, 1 OF, and PARER). The selections OUTSTANDING FRAME and NUM REC NOT = NUM EXP appear only if an emulate mode is selected on the Parameter 1 menu.

On the Trigger Actions menu (Figure 36-19), you may select GooD or BaD block check for a transmission. This selection is for the final block check (BCC2) of a data or maintenance (MOP) message. The header block check (BCC1) can be selected as good or bad on the Message menu. In control messages, there is only one block check; the block check selection on the Trigger Actions menu (BCC2) does not apply.

36.6.3 Transmitting in Synchronous DDCMP

If you have selected DDCMP (not DDCMP ASYNC) on the Parameters 1 menu, you must insert SYN characters before any transmission. On Message menu 0, select LINE as destination, and NO for BEGIN FRAME. In the text field, enter the desired number of SYN characters in hexadecimal. (The standard DDCMP synchronization character is 96, hex, regardless of the data code used.)

On Message menus 1 through F, enter any DDCMP messages you wish. On a Trigger Actions menu, select XMIT YES, and in the data-entry field following, enter message 0 and the message you wish to transmit. This will send the SYN characters, followed immediately by the message.

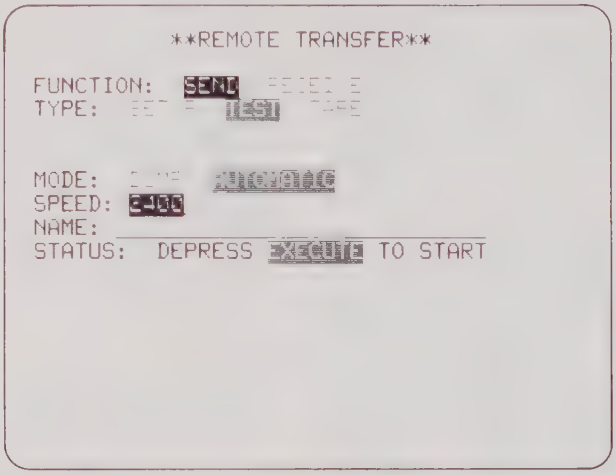
36.6.4 Sending Long Data Messages and Concatenated Messages

The text field of the Message menu has room for 210 characters. You may wish to send (from a single Trigger) a Data or MOP message longer than that, or include the factory-stored Fox message in a data message. To do this, simply select BEGIN FRAME YES for the first Message menu, and NO for subsequent message menus. Set the Trigger Actions menu to first transmit the sychronization characters, then the Message menus themselves. The 4600 will compute the character count and block checks automatically. Similarly, you can send several groups of long messages with a single Trigger by selecting BEGIN FRAME YES for the first message menu of each group.

When sending concatenated messages, be sure to set the Q bit to 0 on the first Message menu unless you transmit SYN characters between messages. Setting the Q flag to 0 tells the 4600 that another message will immediately follow without synchronization characters. As with sending long messages, you may send two or more concatenated messages with a single Trigger.

On the Trigger Actions menu, the block check selection (GooD or BaD) will apply to all of the final block checks sent by the trigger; so if the Trigger action is transmission of two messages, both will have good or bad final block checks, depending on your selection.

37. REMOTE TRANSFER



```
**REMOTE TRANSFER**

FUNCTION:  SEND   RECEIVE
TYPE:  SETUP  TEST   TAPE


MODE:  [illegible]   AUTOMATIC
SPEED: 2400
NAME:
STATUS:  DEPRESS EXECUTE TO START
```

Figure 37-1 Remote Transfer menu (Parameters 8).

TABLE 37-1
4600 SEND AND RECEIVE REMOTE TRANSFER CAPABILITIES

INTERVIEW	Information Transferred (Note 1)
4600	Data, Tests, Setups
4500 with Remote Transfer option	Data, Tests, Setups
3900 with Remote Transfer option	Data
3600 with Remote Transfer option	Data
20R with Remote Transfer Option	Data

Note 1: Data = data recorded on tape; Test = complete program; Setup = Parameters 1 and 2 menu configuration.

37

REMOTE TRANSFER

37.1 REMOTE TRANSFER CAPABILITIES

The INTERVIEW 4600 can transfer information to or receive it from a remote member of the INTERVIEW family using the PRINTER/REMOTE interface on the rear panel, provided that the remote INTERVIEW also has Remote Transfer capability. These Remote Transfers are controlled by the Remote Transfer menu (Parameters 8; Figure 37-1), and can be conducted either through modems or via direct cable. The transfers are not remotely controlled: an operator is required both at the sending and at the receiving device.

In Remote Transfer Mode, the 4600 can send data stored on its tape to another INTERVIEW or receive and record on its own tape data received from another INTERVIEW (it cannot send data from or receive it in its CRT data buffer). The 4600 can also send complete tests or setups (a setup consists of the Parameters 1 and 2 configuration only) to (or receive them from) another 4600 or a 4500 fitted with the Remote Option. Table 37-1 specifies the devices with which the 4600 can do Remote Transfers and the types of information that can be transferred.

The 4600 transfers data in one of two modes: automatic or dump. When it is in the automatic mode, the 4600 requests and waits for acknowledgments from the remote device during transfer. When it is dumping, the 4600 does not request or wait for acknowledgments; the information is transmitted immediately whether or not the remote device is ready to receive the transfer.

When the PRINTER/REMOTE interface is used to send information to a printer, the Printer Control menu (Parameters 3) must be used.

37.2 HARDWARE CONFIGURATION

37.2.1 Printer/Remote Interface

The Printer/Remote interface on the rear panel of the INTERVIEW 4600 always appears as a modem. DSR and RLSD are constantly driven ON. When the INTERVIEW is performing a Remote Transfer SEND function, it transmits on Pin 3 (RD) of the Printer/Remote connector. If it is performing the RECEIVE function, it expects to receive on Pin 2 (TD) of that connector.

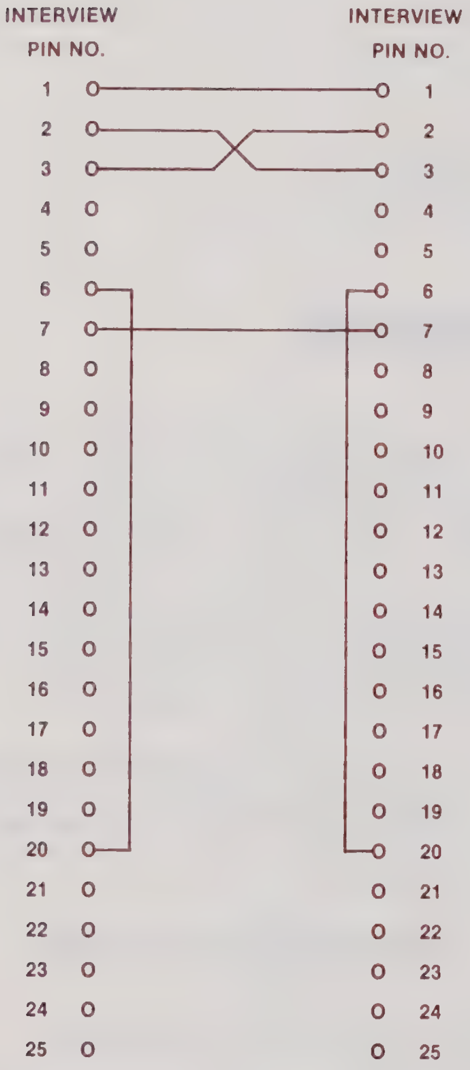


Figure 37-2 INTERVIEW-to-INTERVIEW Cable wiring diagram.

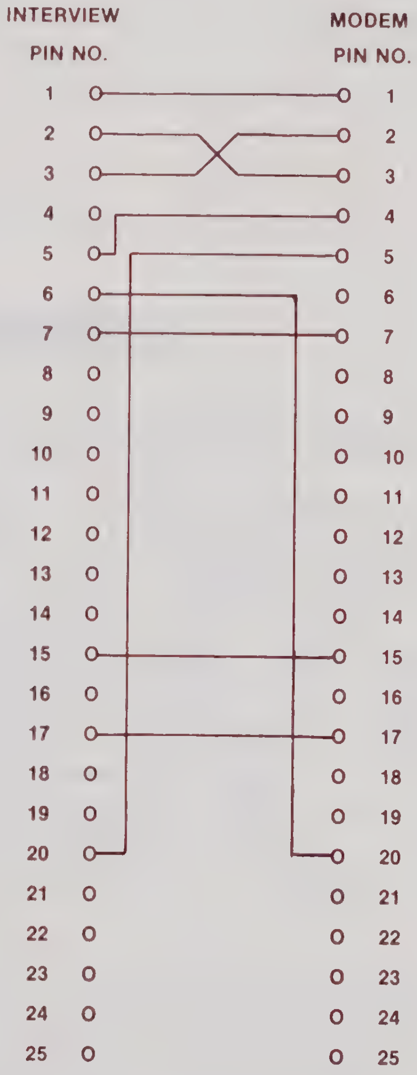


Figure 37-3 INTERVIEW-to-Modem Cable wiring diagram.

37.2.2 Cables and Configurations

Because the Printer/Remote interface appears as a modem, special cables must be used for the Remote Transfer functions to make the 4600 appear as a terminal. The cables used are the INTERVIEW-TO-INTERVIEW cable and the INTERVIEW-TO-MODEM cable. Wiring diagrams for each are represented in Figures 37-2 and 37-3. Cable configurations for several typical applications are discussed below.

(a) Remote Transfer in Automatic Mode. Figure 37-4 illustrates the cabling requirements for the 4600 to send and receive information in the automatic mode. When transferring between the 4600 and an INTERVIEW 4600, 4500, 3900, or 3600 via modems, use the INTERVIEW-to-Modem cable (Figure 37-3) between each INTERVIEW and its modem.

> NOTE: The INTERVIEW-to-Modem cable can be connected in only one direction. Be sure to connect the end labeled INTERVIEW to the INTERVIEW's Printer/Remote connector, and the end labeled MODEM to the modem.

When transferring directly between one INTERVIEW 4600 and an INTERVIEW 4600, 4500, 3900, or 3600, use the INTERVIEW-to-INTERVIEW cable. Connect this cable between the two Printer/Remote connectors.

(b) Sending in Dump Mode. When sending (in DUMP mode) to a recording device via modems, use the INTERVIEW-to-Modem cable (see Figure 37-5). The INTERVIEW-to-INTERVIEW cable is used for dumping directly to a local recording device.

(c) Receiving in Dump Mode. If the 4600 is to receive data in the dump mode (either directly or via modems), it must be connected to the data source via an RS-232/V.24 cable (see Figure 37-6). The cable should be connected to the Printer/Remote interface on the rear panel. The RS-232/V.24 cable is necessary because the Printer/Remote interface expects to receive data on Pin 2.

(d) Remote Transfer with an INTERVIEW 20R. In transfers between a 4600 and an INTERVIEW 20R (in automatic or dump modes), the 4600 connects to its modem with an INTERVIEW-TO-MODEM cable, and the 20R connects to its modem with an RS-232/V.24 cable (see Figure 37-7).

For direct transfer between the INTERVIEW 4600 and the INTERVIEW 20R a Modem-Eliminator Cable must be used (modem-eliminator cables can be identified in the ARC Teleproducts Price List by "ME" in the model number).

37.2.3 Line-Level Handshaking

Before and during a remote transfer, the 4600 conducts handshaking first at the physical line level, then at the protocol level. At the line level, when the EXECUTE key is pressed while SEND is selected on the Remote Transfer menu, RTS is turned on, and TRANSMITTING appears on the Status line. RTS will stay on until CTS ON is received.

When CTS ON is received, the first message block is actually transmitted in hexadecimal-encoded ASCII on TD (Pin 2). Between consecutive message blocks, RTS is again driven ON, and the 4600 waits 1 second for CTS ON. If CTS is not received within that time, the 4600 displays NO RECEIVER RESPONSE on the Status line and the transmission is terminated.

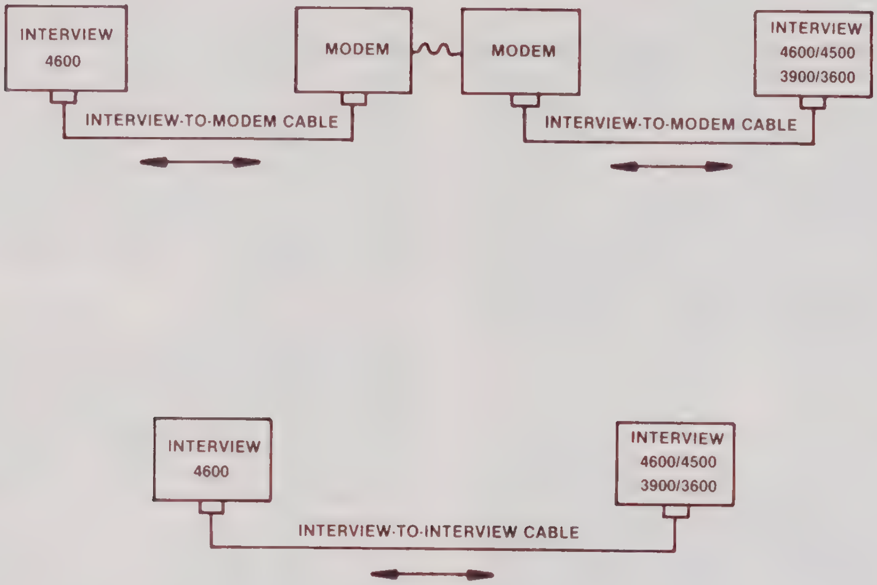


Figure 37-4 Remote Transfer in the Automatic Mode. Cable is always connected to the Printer/Remote connector of the INTERVIEW.

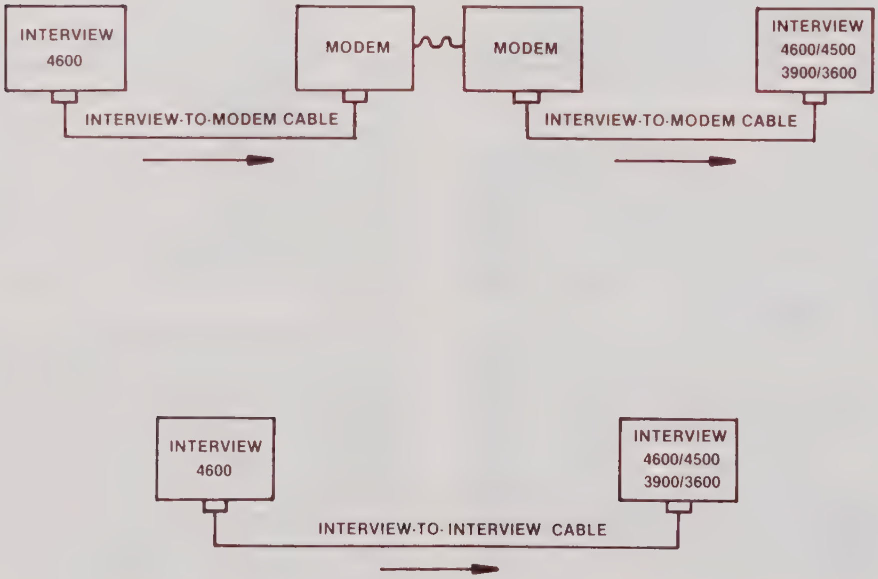


Figure 37-5 Sending a Remote Transfer in the Dump Mode. Cable is always connected to the Printer/Remote connector of the INTERVIEW.

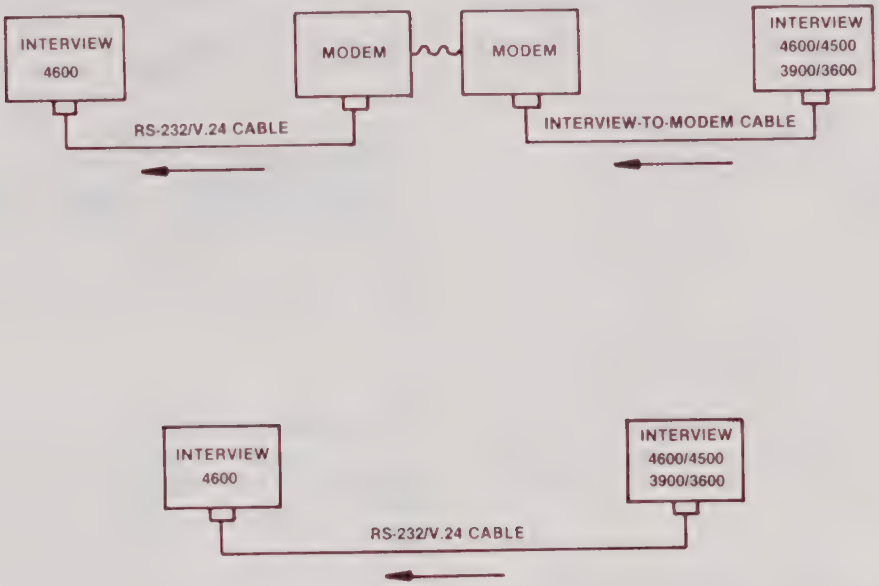


Figure 37-6 Receiving a Remote Transfer in Dump Mode. Cable is always always connected to the Printer/Remote connector of the INTERVIEW.

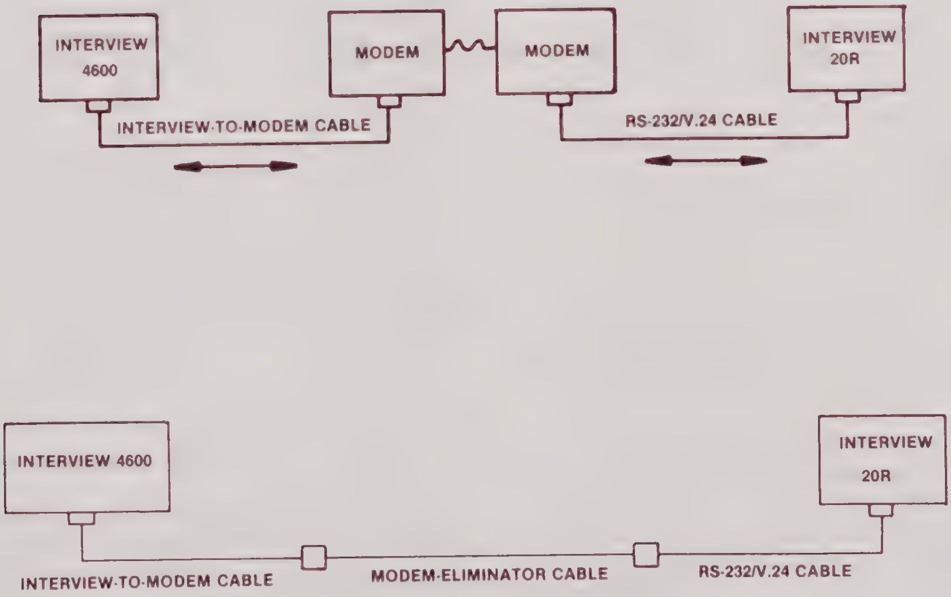
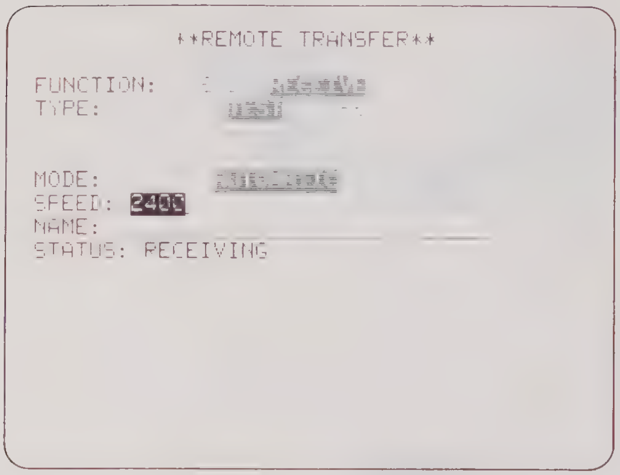
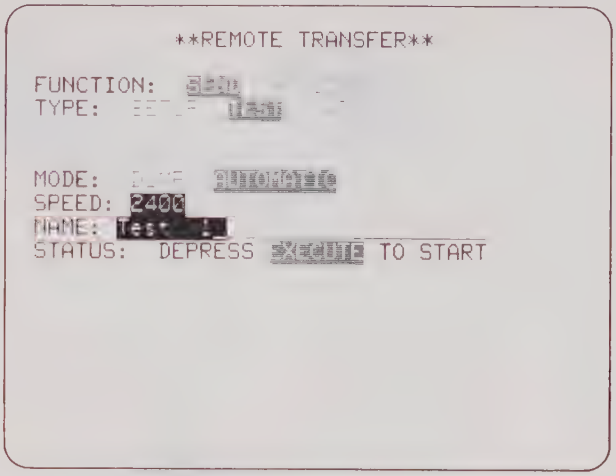


Figure 37-7 Remote Transfer between INTERVIEW 4600 and INTERVIEW 20R, in Automatic or Dump Mode. Cables are connected to the Printer/Remote connector of each device.



```
            **REMOTE TRANSFER**

FUNCTION:            RECEIVE
TYPE:               TEST


MODE:               AUTOMATIC
SPEED: 2400
NAME:
STATUS: RECEIVING
```

Figure 37-8 Receiving a Test in Automatic Mode.



```
            **REMOTE TRANSFER**

FUNCTION:  SEND
TYPE:    SETUP  TEST


MODE:          AUTOMATIC
SPEED: 2400
NAME: Test 1
STATUS:  DEPRESS EXECUTE TO START
```

Figure 37-9 Sending a Test in Automatic Mode.

37.2.4 Protocol-Level Handshaking

(a) Automatic Mode. When transmitting in automatic mode, the 4600 waits for 1 second at the end of each message block for an ACK. If no ACK is received, the 4600 sends an ENQ and waits 1 second for a response. If after five ENQs no ACK is received, the 4600 displays NO RECEIVER RESPONSE on the Status line and transmission is terminated.

(b) Dump Mode. When transmitting in dump mode, the 4600 conducts no protocol-level handshaking. Between message blocks the 4600 waits 100 milliseconds before driving RTS on, then waits 1 second for CTS. A message block is sent each time CTS is received.

37.3 REMOTE TRANSFER IN THE AUTOMATIC MODE

Transfer of information between the 4600 and remote devices is most often performed in the Automatic mode of the Remote Transfer menu.

In the Automatic mode the INTERVIEW conducts handshaking; then requests and waits for acknowledgments during the transmission. Information is transmitted in hexadecimal-encoded ASCII and is formatted using a BISYNC protocol subset, with error checking (7 bits, even parity, even LRC).

37.3.1 Transferring Setups or Tests

The 4600 can transfer setup and test information only with another 4600 or with a 4500 fitted with the Remote Transfer option. To transfer test or setup information to another 4500 or 4600, first set one INTERVIEW to receive the information.

(a) Receiving Setups or Tests. On the Remote Transfer menu (Parameters 8) of the destination INTERVIEW 4600, select

FUNCTION: RECEIVE
MODE: AUTOMATIC.
TYPE: TEST or SETUP

Enter the SPEED (in bits per second) at which the transfer is to proceed. The default value is 2400; the maximum is 9600. Press the EXECUTE key. On the STATUS line the message RECEIVING will blink, indicating that the unit is ready to receive either a test or setup at the Printer/Remote connector. (See Figure 37-8.)

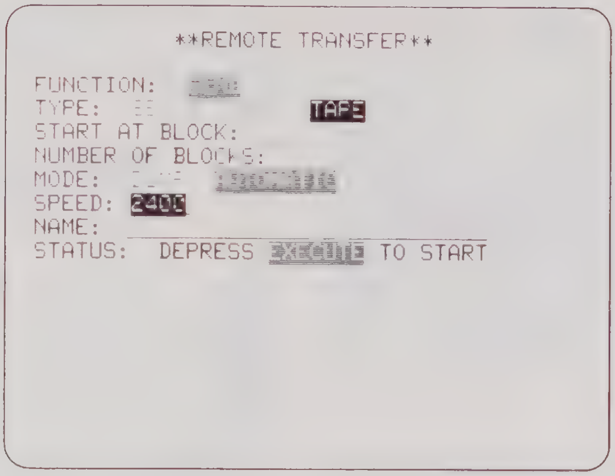
(b) Sending Setups or Tests. Now set the other INTERVIEW to send the information. On the Remote Transfer menu of the source unit, select FUNCTION: SEND. In the TYPE field, select either --

(1) SETUP. Only the basic Setup configuration (Parameters 1 and 2 menus) will be transferred.

(2) TEST. The configurations of all menus, including the Trigger, Statistics and Message-Entry menus will be transferred.

For MODE, on Line 7, select AUTOMATIC. On Line 8 enter a SPEED. Be sure that the speed is the same as that selected on the destination unit.

In the NAME field (Line 9), you may enter a name for the program you are transmitting. This name will automatically be written on the NAME line in the destination unit. You may use up to 23 alphanumeric or control characters. Figure 37-9 shows the Remote Transfer menu ready to send a test named "Test 1."



```
              **REMOTE TRANSFER**

FUNCTION:  [illegible]
TYPE:  [illegible]              TAPE
START AT BLOCK:
NUMBER OF BLOCKS:
MODE:  [illegible]  [illegible]
SPEED: 2400
NAME:
STATUS:   DEPRESS EXECUTE TO START
```

Figure 37-10 Sending Data from the data tape. Enter tape block numbers to identify the data to be sent.

Press the EXECUTE key. The STATUS line will blink the message TRANSMITTING, indicating that the INTERVIEW 4600 has initiated the handshaking routine.

When handshaking has been accomplished between the two INTERVIEWs, or with the modem, a decrementing hexadecimal number will appear at the right of the Status field in each unit. This number is the number of bytes still to be sent or received. When it reaches 00 00 (hex), the transfer has been accomplished, and the STATUS messages on the source and destination units will change to TRANSMITTED and RECEIVED, respectively.

The program from the source unit will be in the destination unit ready to run as soon as the RUN key is depressed.

37.3.2 Transferring Data

The INTERVIEW 4600 is capable of transferring data from its data tape to a variety of other INTERVIEWs (see Table 37-1). The procedure for transferring data in the automatic mode is very similar to that of transferring setups and tests. The major difference is the need to identify the location on the tape of the data to be transferred.

(a) Sending Data. To send data from the 4600 to another INTERVIEW, select SEND on line 3 and TAPE on line 4 of the Remote Transfer menu. This displays the START AT BLOCK and NUMBER OF BLOCKS fields, which refer to the data blocks on the tape (see Figure 37-10; for an explanation of data blocks, see Section 22.2). Enter the range of blocks that you wish to send from the 4600.

NOTE: If you specify a NUMBER OF BLOCKS larger than the number of blocks remaining on the tape, the tape will loop through Block 000. For instance, if there are 250 blocks of data on the tape and 40 blocks are specified to be sent starting from block 230, the transmission will end with block 20.

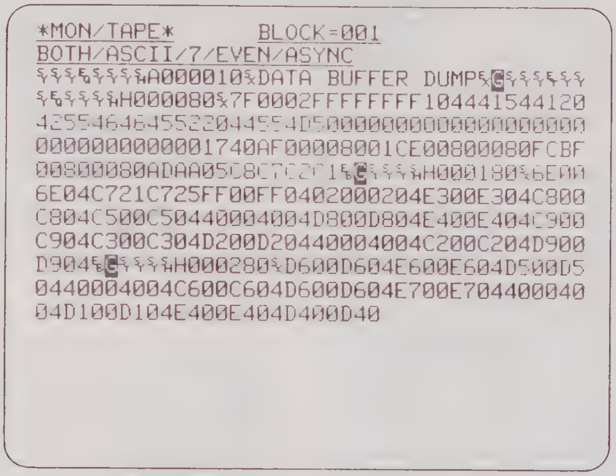
For MODE, on Line 7, select AUTOMATIC. On Line 8 enter a SPEED. Be sure that the speed is the same as that selected on the destination unit. In the NAME field (Line 9), enter a name for the program you are transmitting.

Press EXECUTE. The decrementing hexadecimal number will appear and the STATUS message will display TRANSMITTING. When the transmission is complete, the STATUS message will read TRANSMITTED.

(b) Receiving Data. To receive data from another INTERVIEW in the Automatic mode, select FUNCTION: RECEIVE and TYPE: TAPE. This displays the START AT BLOCK command. Enter the number of the block at which recording is to begin.

NOTE: In receive mode the data tape will not loop to the beginning of the tape. When the end of the tape is reached, the message END OF CAPTURE MEMORY is displayed on the Status Line and further transmission is aborted.

Select AUTOMATIC and set the appropriate speed. Press EXECUTE. The STATUS message will display RECEIVING. When the transmission is complete, the STATUS message will read RECEIVED.



```
*MON/TAPE*        BLOCK=001
BOTH/ASCII/7/EVEN/ASYNC
␖␖␖E␖␖␖␁A000010␂DATA BUFFER DUMP␃G␖␖␖E␖␖
␖E␖␖␖␁H000080␂7F0002FFFFFFFF104441544120
4255464645522044554D50000000000000000000
0000000000001740AF00008001CE00800080FCBF
00800080ADAA05C8C7C2C1␃G␖␖␖␁H000180␂6E00
6E04C721C725FF00FF0402000204E300E304C800
C804C500C5044000400 4D800D804E400E404C900
C904C300C304D200D2044000 4004C200C204D900
D904␃G␖␖␖␁H000280␂D600D604E600E604D500D5
0440004004C600C604D600D604E700E704400040
04D100D104E400E404D400D40
```

Figure 37-11 Data display during dump.

37.3.3 Aborting an Automatic Transfer

During a transfer, all keys except the PROGRAM key are illegal on both the source and the destination unit. The transfer cannot be restarted until it has been aborted. To abort a transfer of any type from the source INTERVIEW, press the PROGRAM key twice during the transfer. On the source unit, the Program Selection menu will be displayed; on the destination unit, the STATUS line will blink TRANSMISSION ABORTED.

To abort a transfer from the destination unit, press PROGRAM twice during the transfer. On the destination unit, the Menu Selections menu will be displayed. On the source unit -- after a brief delay -- the STATUS message NO RECEIVER RESPONSE will blink.

Whichever unit aborts the transfer, the program in the destination unit before the aborted transfer will not be disturbed. However, when a data transfer is aborted, the Data Tape in the destination unit will be overwritten up to the location at which the transfer was aborted.

37.4 REMOTE TRANSFER IN THE DUMP MODE

When DUMP is selected on the Remote Transfer menu, the transfer takes place immediately when the EXECUTE key is depressed, whether or not the INTERVIEW is linked to the recording device. It does not request or wait for acknowledgments.

> NOTE: When a record is DUMPed back to the INTERVIEW 4600 from a recording device, the first byte of the record header must be the first thing received after the synchronization characters; otherwise, the 4600 will be unable to use the record. This should be taken into consideration when the program or data is being recorded.

37.4.1 Sending a Dump

Data, tests or setups may be dumped from the 4600 to other members of the INTERVIEW family (see Table 37-1). To send information in the dump mode, connect the INTERVIEW 4600 to the recording device with the INTERVIEW-to-Modem cable, as explained in Section 37.2.2b.

On the Remote Transfer menu, select FUNCTION: SEND, the TYPE of information to be sent, and MODE: DUMP. Enter a SPEED corresponding to that of the recording device, and a NAME.

Set up the recording device to expect asynchronous data with the following characteristics: ASCII, 7 bits, even parity, even LRC, no clock supplied. The speed must agree with that entered on the Remote Transfer menu.

Start the recording device; then press the EXECUTE key on the INTERVIEW 4600.

> NOTE: It is important that the first byte dumped be recorded, so that when the recorded program or data is played back, the INTERVIEW 4600 can read the record header correctly.

During the transfer, the hexadecimal number of bytes remaining to be transferred will be decrementing at the right of the STATUS field. When the transfer is complete, this number will read 00 00; then the Status line will display TRANSMITTED.

If the program or data is viewed on the recording device, it will not be intelligible, because the data stream is in hexadecimal-encoded ASCII. However, the NAME of the program or data will be sent in clear text at the beginning of each dump so each record can be clearly identified (see Figure 37-11).

37.4.2 Receiving a Dump

Connect the recording device to the INTERVIEW's Printer/Remote interface using a standard RS-232/V.24 cable as explained in Section 37.2.2c. Set up the recording device to play back data to the INTERVIEW 4600 on Pin 2 (TD).

NOTE: When the INTERVIEW 4600 is receiving a dump record there should be no protocol embedded in the record by the communication system, and the INTERVIEW should not receive any data before the first byte in the record.

On the Remote Transfer menu, select FUNCTION: RECEIVE and MODE: DUMP. Be sure the playback speed is the same as the SPEED selected on the Remote Transfer menu.

Press the EXECUTE key; then start playback from the recording device.

37.4.3 Aborting a Dump

During a dump, all keys except PROGRAM are illegal. The transfer cannot be restarted until it has been aborted.

To abort a transfer of any type from the INTERVIEW 4600, press the PROGRAM key twice during the transfer. This will display the Program Selection menu, and stop the transmission.

A dump cannot be aborted by the destination device. If the destination device ceases to receive or record, or if the link between it and the INTERVIEW is broken during the dump, the INTERVIEW 4600 will continue to transmit, as indicated by the STATUS message TRANSMITTING on its Remote Transfer menu.

APPENDIX A
KEYBOARD TRANSLATION TABLES

EBCDIC

KEY	UNSHIFTED		SHIFTED		CONTROL	
A	a	81	A	C1	SOH	01
B	b	82	B	C2	STX	02
C	c	83	C	C3	ETX	03
D	d	84	D	C4	EOT	37
E	e	85	E	C5	ENQ	2D
F	f	86	F	C6	ACK	2E
G	g	87	G	C7	BELL	2F
H	h	88	H	C8	BS	16
I	i	89	I	C9	HT	05
J	j	91	J	D1	LF	25
K	k	92	K	D2	VT	0B
L	l	93	L	D3	FF	0C
M	m	94	M	D4	GS	1D
N	n	95	N	D5	SO	0E
O	o	96	O	D6	SI	0F
P	p	97	P	D7	DLE	10
Q	q	98	Q	D8	DC1	11
R	r	99	R	D9	DC2	12
S	s	A2	S	E2	DC3	13
T	t	A3	T	E3	DC4	3C
U	u	A4	U	E4	NAK	3D
V	v	A5	V	E5	SYN	32
W	w	A6	W	E6	ETB	26
X	x	A7	X	E7	CAN	18
Y	y	A8	Y	E8	EM	19
Z	z	A9	Z	E9	SUB	3F
0	0	F0	¦	6A	—	—
1	1	F1	!	5A	—	—
2	2	F2	"	7F	—	—
3	3	F3	#	7B	—	—
4	4	F4	$	5B	—	—
5	5	F5	%	6C	—	—
6	6	F6	&	50	—	—
7	7	F7	'	7D	—	—
8	8	F8	(	4D	—	—
9	9	F9	)	5D	—	—
SPACE	SPACE	40	SPACE	40	—	—
:	:	7A	*	5C	ESC	27
;	;	5E	+	4E	NULL	00
,	,	6B	<	4C	RS	35
- DASH	-	60	=	7E	—	—
.	.	4B	>	6E	—	—
/	/	61	?	6F	FS	22
[	—	—	{	C0	—	—
\	\	E0	@	7C	—	—
]	—	—	}	D0	—	—
∧	—	—	~	A1	—	—
UNDERLINE	_	6D	`	79	DEL	07
NL	LF	25	LF	25		
CR	CR	0D	CR	0D	CR	0D

ASCII and HEX (Space Parity shown)

KEY	UNSHIFTED		SHIFTED		CONTROL	
A	a	61	A	41	SOH	01
B	b	62	B	42	STX	02
C	c	63	C	43	ETX	03
D	d	64	D	44	EOT	04
E	e	65	E	45	ENQ	05
F	f	66	F	46	ACK	06
G	g	67	G	47	BELL	07
H	h	68	H	48	BS	08
I	i	69	I	49	HT	09
J	j	6A	J	4A	LF	0A
K	k	6B	K	4B	VT	0B
L	l	6C	L	4C	FF	0C
M	m	6D	M	4D	GS	1D
N	n	6E	N	4E	SO	0E
O	o	6F	O	4F	SI	0F
P	p	70	P	50	DLE	10
Q	q	71	Q	51	DC1	11
R	r	72	R	52	DC2	12
S	s	73	S	53	DC3	13
T	t	74	T	54	DC4	14
U	u	75	U	55	NAK	15
V	v	76	V	56	SYN	16
W	w	77	W	57	ETB	17
X	x	78	X	58	CAN	18
Y	y	79	Y	59	EM	19
Z	z	7A	Z	5A	SUB	1A
0	0	30	¦	7C	—	—
1	1	31	!	21	—	—
2	2	32	"	22	—	—
3	3	33	#	23	—	—
4	4	34	$	24	—	—
5	5	35	%	25	—	—
6	6	36	&	26	—	—
7	7	37	'	27	—	—
8	8	38	(	28	—	—
9	9	39	)	29	—	—
SPACE	SPACE	20	SPACE	20	—	—
:	:	3A	*	2A	ESC	1B
;	;	3B	+	2B	NULL	00
,	,	2C	<	3C	RS	1E
- DASH	-	2D	=	3D	—	—
.	.	2E	>	3E	VS	1F
/	/	2F	?	3F	FS	1C
[	[	5B	{	7B	—	—
\	\	5C	@	40	—	—
]	]	5D	}	7D	—	—
∧	∧	5E	~	7E	—	—
UNDERLINE	_	5F	`	60	DEL	7F
NL	LF	0A	LF	0A	FLAG	7E
CR	CR	0D	CR	0D	CR	0D

EBCD (Odd Parity shown)

KEY	UNSHIFTED		SHIFTED		CONTROL	
A	a	23	A	23	SOH	—
B	b	13	B	13	STX	—
C	c	73	C	73	ETX	—
D	d	0B	D	0B	EOT	7C
E	e	6B	E	6B	ENQ	—
F	f	5B	F	5B	ACK	—
G	g	3B	G	3B	BELL	—
H	h	07	H	07	BS	5D
I	i	67	I	67	HT	2F
J	j	61	J	61	LF	6E
K	k	51	K	51	VT	—
L	l	31	L	31	FF	—
M	m	49	M	49	GS	—
N	n	29	N	29	SO	—
O	o	19	O	19	SI	—
P	p	79	P	79	DLE	—
Q	q	45	Q	45	DC1	—
R	r	25	R	25	DC2	—
S	s	52	S	52	DC3	—
T	t	32	T	32	DC4	—
U	u	4A	U	4A	NAK	—
V	v	2A	V	2A	SYN	—
W	w	1A	W	1A	ETB	—
X	x	7A	X	7A	CAN	—
Y	y	46	Y	46	EM	—
Z	z	26	Z	26	SUB	—
0	0	54	¦	—	—	—
1	1	20	!	75	—	—
2	2	10	"	34	—	—
3	3	70	#	34	—	—
4	4	08	$	75	—	—
5	5	68	%	68	—	—
6	6	58	&	43	—	—
7	7	38	'	58	—	—
8	8	04	(	64	—	—
9	9	64	)	54	—	—
SPACE	SPACE	40	SPACE	40	—	—
:	:	08	*	04	ESC	—
;	;	6B	+	43	NULL	—
,	,	76	<	10	RS	2C
– DASH	–	37	=	13	—	—
.	.	37	>	38	US	—
/	/	62	?	07	FS	—
[	[	20	{	—	—	—
\	\	—	@	10	—	—
]	]	20	}	—	—	—
∧	∧	—	~	—	—	—
UNDERLINE	_	—	—	—	DEL	7F
NL	NL	6D	LF	6E	FLAG	7E
CR	CR	6D	CR	6D	CR	6D

XS-3 (SY = 35; EOM = 55)

KEY	UNSHIFTED		SHIFTED		CONTROL	
A	a	14	A	14	SOH	—
B	b	15	B	15	STX	—
C	c	16	C	16	ETX	—
D	d	17	D	17	EOT	—
E	e	18	E	18	ENQ	—
F	f	19	F	19	ACK	—
G	g	1A	G	1A	BELL	—
H	h	1B	H	1B	BS	—
I	i	1C	I	1C	HT	—
J	j	24	J	24	LF	—
K	k	25	K	25	VT	—
L	l	26	L	26	FF	—
M	m	27	M	27	GS	—
N	n	28	N	28	SO	—
O	o	29	O	29	SI	—
P	p	2A	P	2A	DLE	—
Q	q	2B	Q	2B	DC1	—
R	r	2C	R	2C	DC2	—
S	s	35	S	35	DC3	—
T	t	36	T	36	DC4	—
U	u	37	U	37	NAK	—
V	v	38	V	38	SYN	—
W	w	39	W	39	ETB	—
X	x	3A	X	3A	CAN	—
Y	y	3B	Y	3B	EM	—
Z	z	3C	Z	3C	SUB	—
0	0	03	¦	—	—	—
1	1	04	!	23	—	—
2	2	05	"	—	—	—
3	3	06	#	1F	—	—
4	4	07	$	22	—	—
5	5	08	%	2D	—	—
6	6	09	&	33	—	—
7	7	0A	'	2E	—	—
8	8	0B	(	31	—	—
9	9	0C	)	3D	—	—
SPACE	SPACE	00	SPACE	00	—	—
:	:	11	*	21	ESC	—
;	;	0E	+	10	NULL	—
,	,	32	<	1E	RS	—
– DASH	–	02	=	1D	—	—
.	.	12	>	3E	US	—
/	/	34	?	13	FS	—
[	[	0F	{	—	—	—
\	\	0D	@	20	—	—
]	]	01	}	—	—	—
∧	∧	2F	~	—	—	—
UNDERLINE	_	—	`	—	DEL	—
NL	NL	—	LF	—	FLAG	—
CR	CR	—	CR	—	CR	—

IPARS

KEY	UNSHIFTED		SHIFTED		CONTROL	
A	a	31	A	31	SOH	—
B	b	32	B	32	STX	—
C	c	33	C	33	ETX	1D
D	d	34	D	34	EOT	—
E	e	35	E	35	ENQ	—
F	f	36	F	36	ACK	—
G	g	37	G	37	BELL	0F
H	h	38	H	38	BS	—
I	i	39	I	39	HT	0D
J	j	21	J	21	LF	—
K	k	22	K	22	VT	—
L	l	23	L	23	FF	—
M	m	24	M	24	GS	—
N	n	25	N	25	SO	—
O	o	26	O	26	SI	—
P	p	27	P	27	DLE	3D
Q	q	28	Q	28	DC1	—
R	r	29	R	29	DC2	—
S	s	12	S	12	DC3	1E
T	t	13	T	13	DC4	—
U	u	14	U	14	NAK	2D
V	v	15	V	15	SYN	3E
W	w	16	W	16	ETB	—
X	x	17	X	17	CAN	—
Y	y	18	Y	18	EM	—
Z	z	19	Z	19	SUB	—
0	0	0A	¦	—	—	—
1	1	01	!	—	—	—
2	2	02	"	—	—	—
3	3	03	#	1B	—	—
4	4	04	$	30	—	—
5	5	05	%	3C	—	—
6	6	06	&	—	—	—
7	7	07	'	—	—	—
8	8	08	(	2F	—	—
9	9	09	)	2E	—	—
SPACE	SPACE	1C	SPACE	1C	—	—
:	:	2A	*	0B	ESC	—
;	;	1F	+	—	NULL	00
,	,	1A	<	—	RS	—
- DASH	-	3B	=	—	—	—
.	.	—	>	—	US	—
/	/	—	?	3A	FS	—
[	[	—	{	—	—	—
\	\	—	@	20	—	—
]	]	—	}	—	—	—
Λ	Λ	—	~	—	—	—
UNDERLINE	_	—	—	—	DEL	—
NL	NL	—	LF	—	FLAG	7E
CR	CR	0C	CR	0C	CR	0C

REVERSE EBCD (Odd Parity shown)

KEY	UNSHIFTED		SHIFTED		CONTROL	
A	a	31	A	31	SOH	—
B	b	32	B	32	STX	—
C	c	73	C	73	ETX	—
D	d	34	D	34	EOT	5E
E	e	75	E	75	ENQ	—
F	f	76	F	76	ACK	—
G	g	37	G	37	BELL	—
H	h	38	H	38	BS	6E
I	i	79	I	79	HT	3D
J	j	61	J	61	LF	5D
K	k	62	K	62	VT	—
L	l	23	L	23	FF	—
M	m	64	M	64	GS	—
N	n	25	N	25	SO	—
O	o	26	O	26	SI	—
P	p	67	P	67	DLE	—
Q	q	68	Q	68	DC1	—
R	r	29	R	29	DC2	—
S	s	52	S	52	DC3	—
T	t	13	T	13	DC4	—
U	u	54	U	54	NAK	—
V	v	15	V	15	SYN	—
W	w	16	W	16	ETB	—
X	x	57	X	57	CAN	—
Y	y	58	Y	58	EM	—
Z	z	19	Z	19	SUB	—
0	0	4A	¦	—	—	—
1	1	01	!	6B	—	—
2	2	02	"	0B	—	—
3	3	43	#	0B	—	—
4	4	04	$	6B	—	—
5	5	45	%	45	—	—
6	6	46	&	70	—	—
7	7	07	'	46	—	—
8	8	08	(	49	—	—
9	9	49	)	0A	—	—
SPACE	SPACE	40	SPACE	40	SPACE	40
:	:	04	*	08	ESC	—
;	;	03	+	70	NULL	—
,	,	5B	<	02	RS	0D
- DASH	-	20	=	01	—	—
.	.	3B	>	07	US	—
/	/	51	?	51	FS	—
[	[	4C	{	—	—	—
\	\	2C	@	10	—	—
]	]	4C	}	—	—	—
Λ	Λ	2C	~	—	—	—
UNDERLINE	_	—	—	—	DEL	7F
NL	NL	5D	LF	5D	FLAG	7E
CR	CR	6D	CR	6D	CR	6D

BAUDOT

KEY	UNSHIFTED		SHIFTED		CONTROL	
A	a	03	A	03	SOH	—
B	b	19	B	19	STX	—
C	c	0E	C	0E	ETX	—
D	d	09	D	09	EOT	—
E	e	01	E	01	ENQ	—
F	f	0D	F	0D	ACK	—
G	g	1A	G	1A	BELL	—
H	h	14	H	14	BS	—
I	i	06	I	06	HT	—
J	j	0B	J	0B	LF	02
K	k	0F	K	0F	VT	—
L	l	12	L	12	FF	—
M	m	1C	M	1C	GS	—
N	n	0C	N	0C	SO	—
O	o	18	O	18	SI	—
P	p	16	P	16	DLE	—
Q	q	17	Q	17	DC1	—
R	r	0A	R	0A	DC2	—
S	s	05	S	05	DC3	—
T	t	10	T	10	DC4	—
U	u	07	U	07	NAK	—
V	v	1E	V	1E	SYN	—
W	w	13	W	13	ETB	—
X	x	1D	X	1D	CAN	—
Y	y	15	Y	15	EM	—
Z	z	11	Z	11	SUB	—
0	0	16	¦	—	—	—
1	1	17	!	0D	—	—
2	2	13	"	11	—	—
3	3	01	#	14	—	—
4	4	0A	$	09	—	—
5	5	10	%	—	—	—
6	6	15	&	—	—	—
7	7	07	'	0B	—	—
8	8	1A	(	0F	—	—
9	9	18	)	12	—	—
SPACE	SPACE	04	SPACE	04	—	—
:	:	0E	*	—	ESC	—
;	;	1E	+	—	NULL	—
,	,	0C	<	—	RS	—
DASH	-	03	=	—	—	—
.	.	1C	>	—	US	—
/	/	1D	?	19	FS	—
[	[	—	{	—	—	—
\	\	—	@	—	—	—
]	]	—	}	—	—	—
∧	∧	—	~	—	—	—
UNDERLINE	_	—	—	—	DEL	—
NL	NL	02	LF	02	FLAG	7E
CR	CR	08	CR	08	CR	08

SELECTRIC

KEY	UNSHIFTED		SHIFTED		CONTROL	
A	a	39	A	39	SOH	
B	b	36	B	36	STX	
C	c	3A	C	3A	ETX	–
D	d	2A	D	2A	EOT	3C
E	e	0A	E	0A	ENQ	–
F	f	33	F	33	ACK	
G	g	23	G	23	BELL	
H	h	26	H	26	BS	1D
I	i	19	I	19	HT	2F
J	j	03	J	03	LF	2E
K	k	1A	K	1A	VT	–
L	l	06	L	06	FF	
M	m	21	M	21	GS	
N	n	12	N	12	SO	–
O	o	05	O	05	SI	
P	p	0B	P	0B	DLE	
Q	q	1B	Q	1B	DC1	–
R	r	29	R	29	DC2	–
S	s	25	S	25	DC3	
T	t	02	T	02	DC4	
U	u	32	U	32	NAK	
V	v	31	V	31	SYN	–
W	w	35	W	35	ETB	1E
X	x	22	X	22	CAN	–
Y	y	27	Y	27	EM	–
Z	z	14	Z	14	SUB	–
0	0	24	¦	–	–	–
1	1	20	!	–	–	–
2	2	10	"	09	–	–
3	3	30	#	30	–	–
4	4	04	$	04	–	–
5	5	08	%	08	–	
6	6	18	&	28	–	–
7	7	28	'	09	–	–
8	8	38	(	34	–	–
9	9	34	)	24	–	–
SPACE	SPACE	00	SPACE	00	–	–
:	:	AB	*	38	ESC	–
;	;	2B	+	13	NULL	–
,	,	3B	<	–	RS	2C
DASH	-	37	=	13	–	
.	.	11	>	–	VS	–
/	/	07	?	07	FS	–
[	[	A0	{	–	–	
\	\	1F	@	10		
]	]	20	}			
∧	∧	1C	~	–	–	–
UNDERLINE	_	B7	·	–	DEL	3F
NL	LF	2E	LF	2E	FLAG	7E
CR	CR	2D	CR	2D	CR	2D

APPENDIX B
INPUT-TO-DISPLAY TABLES

INPUT HEX	ASCII	EBCDIC	EBCD C1248AB		XS-3	IPARS INPUT = REVERSE HEX	REV EBCD CBA8421		BAUDOT		SELECTRIC	
			LC	UC			LC	UC	LETTERS	FIGURES	LC	UC
00	NU	NU	(SPACE)	(SPACE)	(SPACE)	(HEX)	(SPACE)	(SPACE)	(HEX)	(HEX)	SP	SP
01	SH	SH	—	—	]	1	1	=	E	3	!	–
02	SX	SX	@	(HEX)	—	2	2	<	LF	LF	t	T
03	EX	EX	&	+	0	3	3	;	A	—	j	J
04	ET	(HEX)	8	*	1	4	4	:	(SPACE)	(HEX)	4	$
05	EQ	HT	q	Q	2	5	5	%	S	(HEX)	o	O
06	AK	(HEX)	y	Y	3	6	6	'	I	8	1	L
07	BL	(HEX)	h	H	4	7	7	>	U	7	/	?
08	BS	(HEX)	4	:	5	8	8	*	CR	CR	5	%
09	HT	(HEX)	m	M	6	9	9	(	D	$	'	"
0A	LF	(HEX)	u	U	7	0	0	)	R	4	e	E
0B	VT	VT	d	D	8	*	#	"	J	'	p	P
0C	FF	FF	D2	D2	9	(HEX)	[	]	N	,	(HEX)	(HEX)
0D	CR	CR	(HEX)	(HEX)	\	(HEX)	FF	FF	F	!	(HEX)	(HEX)
0E	SO	SO	(HEX)	(HEX)	;	=	∧	∧	C	:	(HEX)	(HEX)
0F	SI	SI	D4	D4	[	(HEX)	(HEX)	(HEX)	K	(	(HEX)	(HEX)
10	DL	DL	2	<	+	(HEX)	@	(HEX)	T	5	2	@
11	D1	D1	k	K	:	(HEX)	/	?	Z	(HEX)	.	.
12	D2	D2	s	S	.	S	s	S	L	)	n	N
13	D3	D3	b	B	?	T	t	T	W	2	=	+
14	D4	(HEX)	0	)	A	U	u	U	H	#	z	Z
15	NK	(HEX)	#	#	B	V	v	V	Y	6	(HEX)	(HEX)
16	SY	BS	.	.	C	W	w	W	P	0	(HEX)	(HEX)
17	EB	(HEX)	(HEX)	(HEX)	D	X	x	X	Q	1	(HEX)	(HEX)
18	CN	CN	6	'	E	Y	y	Y	O	9	6	(HEX)
19	EM	EM	o	O	F	Z	z	Z	B	?	i	I
1A	SB	(HEX)	w	W	G	—	.	.	G	&	k	K
1B	EC	(HEX)	f	F	H	#	,	(HEX)	∧	∧	q	Q
1C	FS	FS	∧	∧	I	(SPACE)	}	{	M	.	∧	∧
1D	GS	GS	BS	BS	=	(HEX)	(HEX)	(HEX)	X	/	BS	BS
1E	RS	RS	(HEX)	(HEX)	<	(HEX)	(HEX)	(HEX)	V	;	EB	EB
1F	US	US	\	\	#	,	(HEX)	(HEX)	\	\	\	\

INPUT HEX	ASCII	EBCDIC	EBCD C1248AB		XS-3	IPARS INPUT = REVERSE HEX	REV EBCD CBA8421		BAUDOT		SELECTRIC	
			LC	UC			LC	UC	LETTERS	FIGURES	LC	UC
20	(SPACE)	(HEX)	1	=	@	@	—	—	(HEX)	(HEX)	1	[
21	!	(HEX)	j	J	*	J	j	J	(HEX)	(HEX)	m	M
22	″	(HEX)	∧	?	$	K	k	K	(HEX)	(HEX)	x	X
23	#	(HEX)	a	A	!	L	l	L	(HEX)	(HEX)	g	G
24	$	(HEX)	9	(	J	M	m	M	(HEX)	(HEX)	0	)
25	%	LF	r	R	K	N	n	N	(HEX)	(HEX)	s	S
26	&	EB	z	Z	L	O	o	O	(HEX)	(HEX)	h	H
27	'	EC	i	I	M	P	p	P	(HEX)	(HEX)	y	Y
28	(	(HEX)	5	%	N	Q	q	Q	(HEX)	(HEX)	7	&
29	)	(HEX)	n	N	O	R	r	R	(HEX)	(HEX)	r	R
2A	*	(HEX)	v	V	P	:	#	#	(HEX)	(HEX)	d	D
2B	+	(HEX)	e	E	Q	<	$	!	(HEX)	(HEX)	:	:
2C	,	(HEX)	RS	RS	R	+	\	∧	(HEX)	(HEX)	RS	RS
2D	-	EQ	CR	CR	%	(HEX)	CR	CR	(HEX)	(HEX)	CR	CR
2E	.	AK	LF	LF	'	)	BS	BS	(HEX)	(HEX)	LF	LF
2F	/	BL	HT	HT	∧	(	(HEX)	(HEX)	(HEX)	(HEX)	HT	HT
30	0	(HEX)	3	;	-	$	&	+	(HEX)	(HEX)	3	#
31	1	(HEX)	1	L	(	A	a	A	(HEX)	(HEX)	v	V
32	2	SY	t	T	,	B	b	B	(HEX)	(HEX)	u	U
33	3	(HEX)	c	C	&	C	c	C	(HEX)	(HEX)	f	F
34	4	(HEX)	#	″	/	D	d	D	(HEX)	(HEX)	q	(
35	5	(HEX)	$	!	S*	E	e	E	(HEX)	(HEX)	w	W
36	6	(HEX)	,	3B	T	F	f	F	(HEX)	(HEX)	b	B
37	7	ET	.	∧	U	G	g	G	(HEX)	(HEX)	DASH	UNDERLINE
38	8	(HEX)	7	>	V	H	h	H	(HEX)	(HEX)	8	*
39	9	(HEX)	p	P	W	I	i	I	(HEX)	(HEX)	a	A
3A	:	(HEX)	x	X	X	?	(HEX)	(HEX)	(HEX)	(HEX)	c	C
3B	;	(HEX)	g	G	Y	.	.	(HEX)	(HEX)	(HEX)	,	,
3C	<	D4	ET	ET	Z	%	~	`	(HEX)	(HEX)	ET	ET
3D	=	NK	SY	SY	)	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)
3E	>	(HEX)	SH	SH	>	(HEX)	\	\	(HEX)	(HEX)	(HEX)	(HEX)
3F	?	SB	(PAD)	(PAD)	″	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	PAD (DEL)	PAD (DEL)

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* SYNC = even parity S (35_{16}).

INPUT HEX	ASCII	EBCDIC	EBCD C1248AB		XS-3	IPARS INPUT = REVERSE HEX	REV EBCD CBA8421		BAUDOT		SELECTRIC	
			LC	UC			LC	UC	LETTERS	FIGURES	LC	UC
40	@	(SPACE)	(SPACE)	(SPACE)	(SPACE)	(HEX)	(SPACE)	(SPACE)	(HEX)	(HEX)	SP	SP
41	A	(HEX)	—	—	]	(HEX)	1	=	(HEX)	(HEX)	|	–
42	B	(HEX)	@	(HEX)	-	(HEX)	2	<	(HEX)	(HEX)	t	T
43	C	(HEX)	&	+	0	(HEX)	3	;	(HEX)	(HEX)	j	J
44	D	(HEX)	8	*	1	(HEX)	4	:	(HEX)	(HEX)	4	$
45	E	(HEX)	q	Q	2	(HEX)	5	%	(HEX)	(HEX)	o	O
46	F	(HEX)	y	Y	3	(HEX)	6	'	(HEX)	(HEX)	l	L
47	G	(HEX)	h	H	4	(HEX)	7	>	(HEX)	(HEX)	/	?
48	H	(HEX)	4	:	5	(HEX)	8	*	(HEX)	(HEX)	5	%
49	I	(HEX)	m	M	6	(HEX)	9	(	(HEX)	(HEX)	’	”
4A	J	(HEX)	u	U	7	(HEX)	0	)	(HEX)	(HEX)	e	E
4B	K	.	d	D	8	(HEX)	#	"	(HEX)	(HEX)	p	P
4C	L	<	D2	D2	9	(HEX)	[	]	(HEX)	(HEX)	(HEX)	(HEX)
4D	M	(	(HEX)	(HEX)	\	(HEX)	FF	FF	(HEX)	(HEX)	(HEX)	(HEX)
4E	N	+	(HEX)	(HEX)	;	(HEX)	∧	∧	(HEX)	(HEX)	(HEX)	(HEX)
4F	O	(HEX)	D4	D4	[	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)
50	P	&	2	<	+	(HEX)	@	(HEX)	(HEX)	(HEX)	2	@
51	Q	(HEX)	k	K	:	(HEX)	/	?	(HEX)	(HEX)	.	.
52	R	(HEX)	s	S	.	(HEX)	s	S	(HEX)	(HEX)	n	N
53	S	(HEX)	b	B	?	(HEX)	t	T	(HEX)	(HEX)	=	+
54	T	(HEX)	0	)	A	(HEX)	u	U	(HEX)	(HEX)	z	Z
55	U	(HEX)	#	#	B*	(HEX)	v	V	(HEX)	(HEX)	(HEX)	(HEX)
56	V	(HEX)	.	.	C	(HEX)	w	W	(HEX)	(HEX)	(HEX)	(HEX)
57	W	(HEX)	(HEX)	(HEX)	D	(HEX)	x	X	(HEX)	(HEX)	(HEX)	(HEX)
58	X	(HEX)	6	'	E	(HEX)	y	Y	(HEX)	(HEX)	6	(HEX)
59	Y	(HEX)	o	O	F	(HEX)	z	Z	(HEX)	(HEX)	i	I
5A	Z	!	w	W	G	(HEX)	.	.	(HEX)	(HEX)	k	K
5B	[	$	f	F	H	(HEX)	,	(HEX)	(HEX)	(HEX)	q	Q
5C	\	*	∧	∧	I	(HEX)	}	{	(HEX)	(HEX)	∧	∧
5D	]	)	BS	BS	=	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	BS	BS
5E	∧	;	(HEX)	(HEX)	<	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	EB	EB
5F	_	(HEX)	\	\	#	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	\	\

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* EOM = even parity B (55_{16}).

INPUT HEX	ASCII	EBCDIC	EBCD C1248AB		XS-3	IPARS INPUT = REVERSE HEX	REV EBCD CBA8421		BAUDOT		SELECTRIC	
			LC	UC			LC	UC	LETTERS	FIGURES	LC	UC
60	`	—	l	=	@	(HEX)	—	—	(HEX)	(HEX)	l	[
61	a	/	j	J	*	(HEX)	j	J	(HEX)	(HEX)	m	M
62	b	(HEX)	∧	?	$	(HEX)	k	K	(HEX)	(HEX)	x	X
63	c	(HEX)	a	A	!	(HEX)	l	L	(HEX)	(HEX)	g	G
64	d	(HEX)	9	(	J	(HEX)	m	M	(HEX)	(HEX)	0	)
65	e	(HEX)	r	R	K	(HEX)	n	N	(HEX)	(HEX)	s	S
66	f	(HEX)	z	Z	L	(HEX)	o	O	(HEX)	(HEX)	h	H
67	g	(HEX)	i	I	M	(HEX)	p	P	(HEX)	(HEX)	y	Y
68	h	(HEX)	5	%	N	(HEX)	q	Q	(HEX)	(HEX)	7	&
69	i	(HEX)	n	N	O	(HEX)	r	R	(HEX)	(HEX)	r	R
6A	j	¦	v	V	P	(HEX)	#	#	(HEX)	(HEX)	d	D
6B	k	,	e	E	Q	(HEX)	$	!	(HEX)	(HEX)	:	:
6C	l	%	RS	RS	R	(HEX)	\	∧	(HEX)	(HEX)	RS	RS
6D	m	_	CR	CR	%	(HEX)	CR	CR	(HEX)	(HEX)	CR	CR
6E	n	>	LF	LF	'	(HEX)	BS	BS	(HEX)	(HEX)	LF	LF
6F	o	?	HT	HT	∧	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	HT	HT
70	p	(HEX)	3	;	_	(HEX)	&	+	(HEX)	(HEX)	3	#
71	q	(HEX)	l	L	(	(HEX)	a	A	(HEX)	(HEX)	v	V
72	r	(HEX)	t	T	,	(HEX)	b	B	(HEX)	(HEX)	u	U
73	s	(HEX)	c	C	&	(HEX)	c	C	(HEX)	(HEX)	f	F
74	t	(HEX)	#	"	/	(HEX)	d	D	(HEX)	(HEX)	q	(
75	u	(HEX)	$	!	S	(HEX)	e	E	(HEX)	(HEX)	w	W
76	v	(HEX)	,	(HEX)	T	(HEX)	f	F	(HEX)	(HEX)	b	B
77	w	(HEX)	.	∧	U	(HEX)	g	G	(HEX)	(HEX)	DASH -	UNDERLINE _
78	x	(HEX)	7	>	V	(HEX)	h	H	(HEX)	(HEX)	8	*
79	y	`	p	P	W	(HEX)	i	I	(HEX)	(HEX)	a	A
7A	z	:	x	X	X	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	c	C
7B	{	#	g	G	Y	(HEX)	.	(HEX)	(HEX)	(HEX)	,	,
7C	¦	@	ET	ET	Z	(HEX)	~	`	(HEX)	(HEX)	ET	ET
7D	}	'	SY	SY	)	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)
7E	~	=	SH	SH	>	(HEX)	\	\	(HEX)	(HEX)	(HEX)	(HEX)
7F	(PAD) DEL	"	(PAD) DEL	(PAD) DEL	"	(HEX)	(HEX)	(HEX)	(HEX)	(HEX)	PAD (DEL)	PAD (DEL)

INPUT HEX	ASCII	EBCDIC	EBCD C1248AB		XS-3	IPARS INPUT = REVERSE HEX	REV EBCD CBA8421		BAUDOT		SELECTRIC	
			LC	UC			LC	UC	LETTERS	FIGURES	LC	UC
80	NU	(HEX)			(HEX)	(HEX)						
81	SH	a			(HEX)	(HEX)						
82	SX	b			(HEX)	(HEX)						
83	EX	c			(HEX)	(HEX)						
84	ET	d			(HEX)	(HEX)						
85	EQ	e			(HEX)	(HEX)						
86	AK	f			(HEX)	(HEX)						
87	BL	g			(HEX)	(HEX)						
88	BS	h			(HEX)	(HEX)						
89	HT	i			(HEX)	(HEX)						
8A	LF	(HEX)			(HEX)	(HEX)						
8B	VT	(HEX)			(HEX)	(HEX)						
8C	FF	(HEX)			(HEX)	(HEX)						
8D	CR	(HEX)			(HEX)	(HEX)						
8E	SO	(HEX)			(HEX)	(HEX)						
8F	SI	(HEX)			(HEX)	(HEX)						
90	DL	(HEX)			(HEX)	(HEX)						
91	D1	j			(HEX)	(HEX)						
92	D2	k			(HEX)	(HEX)						
93	D3	l			(HEX)	(HEX)						
94	D4	m			(HEX)	(HEX)						
95	NK	n			(HEX)	(HEX)						
96	SY	o			(HEX)	(HEX)						
97	EB	p			(HEX)	(HEX)						
98	CN	q			(HEX)	(HEX)						
99	EM	r			(HEX)	(HEX)						
9A	SB	(HEX)			(HEX)	(HEX)						
9B	EC	(HEX)			(HEX)	(HEX)						
9C	FS	(HEX)			(HEX)	(HEX)						
9D	GS	(HEX)			(HEX)	(HEX)						
9E	RS	(HEX)			(HEX)	(HEX)						
9F	US	(HEX)			(HEX)	(HEX)						

INPUT HEX	ASCII	EBCDIC	EBCD C1248AB		XS-3	IPARS INPUT = REVERSE HEX	REV EBCD CBA8421		BAUDOT		SELECTRIC	
			LC	UC			LC	UC	LETTERS	FIGURES	LC	UC
A0	(SPACE)	(HEX)			(HEX)	(HEX)						
A1	!	~			(HEX)	(HEX)						
A2	"	s			(HEX)	(HEX)						
A3	#	t			(HEX)	(HEX)						
A4	$	u			(HEX)	(HEX)						
A5	%	v			(HEX)	(HEX)						
A6	&	w			(HEX)	(HEX)						
A7	'	x			(HEX)	(HEX)						
A8	(	y			(HEX)	(HEX)						
A9	)	z			(HEX)	(HEX)						
AA	*	(HEX)			(HEX)	(HEX)						
AB	+	(HEX)			(HEX)	(HEX)						
AC	,	(HEX)			(HEX)	(HEX)						
AD	-	(HEX)			(HEX)	(HEX)						
AE	.	(HEX)			(HEX)	(HEX)						
AF	/	(HEX)			(HEX)	(HEX)						
B0	0	(HEX)			(HEX)	(HEX)						
B1	1	(HEX)			(HEX)	(HEX)						
B2	2	(HEX)			(HEX)	(HEX)						
B3	3	(HEX)			(HEX)	(HEX)						
B4	4	(HEX)			(HEX)	(HEX)						
B5	5	(HEX)			(HEX)	(HEX)						
B6	6	(HEX)			(HEX)	(HEX)						
B7	7	(HEX)			(HEX)	(HEX)						
B8	8	(HEX)			(HEX)	(HEX)						
B9	9	(HEX)			(HEX)	(HEX)						
BA	:	(HEX)			(HEX)	(HEX)						
BB	;	(HEX)			(HEX)	(HEX)						
BC	<	(HEX)			(HEX)	(HEX)						
BD	=	(HEX)			(HEX)	(HEX)						
BE	>	(HEX)			(HEX)	(HEX)						
BF	?	(HEX)			(HEX)	(HEX)						

INPUT HEX	ASCII	EBCDIC	EBCD C1248AB		XS-3	IPARS INPUT = REVERSE HEX	REV EBCD CBA8421		BAUDOT		SELECTRIC	
			LC	UC			LC	UC	LETTERS	FIGURES	LC	UC
C0	@	{			(HEX)	(HEX)						
C1	A	A			(HEX)	(HEX)						
C2	B	B			(HEX)	(HEX)						
C3	C	C			(HEX)	(HEX)						
C4	D	D			(HEX)	(HEX)						
C5	E	E			(HEX)	(HEX)						
C6	F	F			(HEX)	(HEX)						
C7	G	G			(HEX)	(HEX)						
C8	H	H			(HEX)	(HEX)						
C9	I	I			(HEX)	(HEX)						
CA	J	(HEX)			(HEX)	(HEX)						
CB	K	(HEX)			(HEX)	(HEX)						
CC	L	(HEX)			(HEX)	(HEX)						
CD	M	(HEX)			(HEX)	(HEX)						
CE	N	(HEX)			(HEX)	(HEX)						
CF	O	(HEX)			(HEX)	(HEX)						
D0	P	}			(HEX)	(HEX)						
D1	Q	J			(HEX)	(HEX)						
D2	R	K			(HEX)	(HEX)						
D3	S	L			(HEX)	(HEX)						
D4	T	M			(HEX)	(HEX)						
D5	U	N			(HEX)	(HEX)						
D6	V	O			(HEX)	(HEX)						
D7	W	P			(HEX)	(HEX)						
D8	X	Q			(HEX)	(HEX)						
D9	Y	R			(HEX)	(HEX)						
DA	Z	(HEX)			(HEX)	(HEX)						
DB	[	(HEX)			(HEX)	(HEX)						
DC	\	(HEX)			(HEX)	(HEX)						
DD	]	(HEX)			(HEX)	(HEX)						
DE	^	(HEX)			(HEX)	(HEX)						
DF	_	(HEX)			(HEX)	(HEX)						

INPUT HEX	ASCII	EBCDIC	EBCD C1248AB		XS-3	IPARS INPUT = REVERSE HEX	REV EBCD CBA8421		BAUDOT		SELECTRIC	
			LC	UC			LC	UC	LETTERS	FIGURES	LC	UC
E0	`	\			(HEX)	(HEX)						
E1	a	E1			(HEX)	(HEX)						
E2	b	S			(HEX)	(HEX)						
E3	c	T			(HEX)	(HEX)						
E4	d	U			(HEX)	(HEX)						
E5	e	V			(HEX)	(HEX)						
E6	f	W			(HEX)	(HEX)						
E7	g	X			(HEX)	(HEX)						
E8	h	Y			(HEX)	(HEX)						
E9	i	Z			(HEX)	(HEX)						
EA	j	(HEX)			(HEX)	(HEX)						
EB	k	(HEX)			(HEX)	(HEX)						
EC	l	(HEX)			(HEX)	(HEX)						
ED	m	(HEX)			(HEX)	(HEX)						
EE	n	(HEX)			(HEX)	(HEX)						
EF	o	(HEX)			(HEX)	(HEX)						
F0	p	0			(HEX)	(HEX)						
F1	q	1			(HEX)	(HEX)						
F2	r	2			(HEX)	(HEX)						
F3	s	3			(HEX)	(HEX)						
F4	t	4			(HEX)	(HEX)						
F5	u	5			(HEX)	(HEX)						
F6	v	6			(HEX)	(HEX)						
F7	w	7			(HEX)	(HEX)						
F8	x	8			(HEX)	(HEX)						
F9	y	9			(HEX)	(HEX)						
FA	z	(HEX)			(HEX)	(HEX)						
FB	{	(HEX)			(HEX)	(HEX)						
FC	¦	(HEX)			(HEX)	(HEX)						
FD	}	(HEX)			(HEX)	(HEX)						
FE	~	(HEX)			(HEX)	(HEX)						
FF	(PAD)	(HEX)			(HEX)	(HEX)						

APPENDIX C
CONTROL CHARACTER MNEMONICS

AK	ACK: Acknowledgment
BL	BEL: Bell
BS	Backspace
CN	CAN: Cancel
CR	Carriage return
D1	DC1: Device control 1
D2	DC2: Device control 2
D3	DC3: Device control 3
D4	DC4: Device control 4
DL	DLE: Data link escape
EB	ETB, EOB: End of transmission block
EC	EOC: End of card
EM	EOM: End of message
EQ	ENQ: Enquiry
ET	EOT: End of transmission
EX	ETX: End of text
FF	Form feed
FS	Field separator

GS	Group separator (or Interchange group separator)
HT	Horizontal tabulate
LF	Line feed
NK	NAK: Negative acknowledgment
NU	Null
Pad	DEL or idle line
RS	Record separator
SB	SUB: Substitute
SH	SOH: Start of header
SI	Shift in
SO	Shift out
SX	STX: Start of text
SY	SYN: Synchronization character
US	Unit separator
VT	Vertical tabulate

APPENDIX D
MESSAGES TO OPERATOR

Message and Code	Comments
BLOCK NOT FOUND (14)	Block specified cannot be found because tape has not been fully recorded or formatted.
BOARD "G" (MEMORY OPTION) NOT INSTALLED!	Board G has failed or been disconnected after power-up (not recommended procedure) and a memory command has been attempted. Power down and verify that cable to memory board is connected properly and memory board is seated in connector.
BOARD "G" PAGE ADDRESS SELECT ERROR	Failure of the logic that finds a block other than zero. Board may, possibly, still be usable to record, play back, or transfer starting from Block 000.
CAPTURE MEMORY FULL	RAM: Indicates that STOP AT END has been SELECTED and recording has stopped at end of RAM.
CHECKING TAPE TYPE	Tape is being read to determine whether a Program-Data or a Program Only Tape is installed.
CONDITIONING DESTINATION TAPE	The destination tape for a duplication is being retensioned.

(cont.)

Message and Code	Comments
CONDITIONING TAPE	The tape presently inserted is being retensioned.
DATA TYPE NOT SUPPORTED	The Data being received at the Printer/Remote interface cannot be displayed by this unit.
DIRECTORY VERSION NOT SUPPORTED	The directory read from tape cannot be converted to the format of the particular unit being used.
DIRECTORY WRITE ERROR (20)	After two tries, the directory could not be verified when read back from the tape after being written.
DUMMY ERR, SOFTWARE TEST (13)	Indicates processor error on Board F. May be seen if recording to tape is attempted at data rate above 19.2 kbps (9.6 kbps with EIA status). (Unlikely to be seen.)
DUPLICATING TAPE	Tape duplication (reading data, writing data, formatting tape, conditioning tape, or waiting for a tape exchange) is in progress.
END OF CAPTURE MEMORY	When receiving a Remote Transfer, displayed when data tape ends. In receive mode, data tape does not loop to beginning.
END OF MEMORY: XXX BLOCKS TRANSFERRED	In transfer from RAM to tape, end of memory encountered before last block to be transferred is reached. (No more data to transfer.) In transfer from tape to RAM, memory full before all specified blocks have been transferred.
FORMATTING DESTINATION TAPE	The destination tape for a duplication is being formatted.
FORMATTING TAPE	The tape presently inserted is being formatted as selected.

(cont.)

Message and Code	Comments
INSERT DESTINATION (WRITE ENABLED) TAPE	The operator is being asked to insert the tape which is to be written to during a duplication.
INSERT SOURCE (WRITE PROTECTED) TAPE	The operator is being asked to insert the tape which is to be read from during a duplication.
INVALID MEMORY COMMAND	Indicates communication error between Board C and Board F. (Unlikely to be seen).
INVALID PROGRAM NUMBER	The operator has entered a program number of 0 (load program) or greater than 100 (load or save program).
INVALID TAPE COMMAND (05)	Indicates communication error between Board C and Board F. (Unlikely to be seen.)
LOADING DIRECTORY	The unit is loading the directory read from the Tape Control Module to the Operator Interface Module and formatting it for display on the CRT.
LOADING PROGRAM	The program read from the tape is being loaded into the Operator Interface Module from the Tape Control Module and stored in memory.
MEMORY BLOCK NOT FOUND - MAX BLK # XXX	RAM block number selected for recording or playback is too large. For 128k RAM option, the maximum block number is 054. Also will occur if RAM-to-tape transfer XFER FROM BLOCK is too large or if tape-to-RAM transfer STARTING AT BLOCK is too large.
NO PROGRAM FOUND (04)	Program-Data Tape contains no recorded INTERVIEW 3900 program. For Program-Only Tape, no program has been recorded in the program record specified to be loaded.

(cont.)

Message and Code	Comments
NO PROGRAM TAPE OPTION	An attempt has been made to load or save with a Program-Only Tape installed, or CONTROL-LOAD PROG has been entered on a unit that does not have the Program-Only Tape option.
NO PROGRAM/DIRECTORY FOUND (16)	No program or directory was found when the tape was read to determine its type.
NO RECEIVER RESPONSE	During an AUTOMATIC Remote Transfer, displayed by the source INTERVIEW when it has stopped receiving acknowledgments from the destination INTERVIEW and has aborted the transmission; or when CTS is not received within 1 second after RTS driven ON.
NOT SETUP TO RECV DATA	The INTERVIEW is set to receive a Test or Setup, but is receiving Data.
POSITIONING TAPE	Tape is being moved to specified Start Block before transfer is initiated.
PREMATURE END OF DATA	Record received in Remote Transfer is shorter than specified by its header.
PROGRAM LOADED	A program has been successfully read from the tape and loaded into the program storage memory for use.
PROGRAM SAVED	A program has been successfully written onto a Program-Data Tape and verified.
PROGRAM TAPE INSTALLED	A Program-Only Tape was read by the unit during the power-up tape read. Since it is not known which program should be used for the automatic power-up, read program, and run procedure, nothing is done.

(cont.)

Message and Code	Comments
PROGRAM TAPE INSTALLED (21)	A Program-Only Tape has been left in the unit when RUN has been pressed and record either is selected or could be selected via a trigger. No recording is allowed to occur.
PROGRAM VERSION NOT SUPPORTED	The program read from the tape cannot be converted to the format of the particular unit being used.
PROGRAM WRITE ERROR (19)	After two tries, the program could not be verified after it was written onto the tape.
RAM TO TAPE TRANSFER ERROR	RAM-to-tape transfer has wrapped past the end of memory and encountered the end of memory again before reaching last block to be transferred. Probable failure of end-of-memory detect logic.
RECEIVED	The INTERVIEW has received a Remote Transfer.
RECEIVING	The INTERVIEW is ready to receive a Remote Transfer.
RECORD CHECKSUM ERROR	In Remote Transfer, a record has been received, but it contained errors and could not be used.
REMOVE DESTINATION (WRITE ENABLED) TAPE	The operator is being asked to remove the tape which is to be written to during a duplication.
REMOVE SOURCE (WRITE PROTECTED) TAPE	The operator is being asked to remove the tape which is to be read from during a duplication.
REWIND ATTEMPT FAILED (03)	Tape may have run off reel, or has been removed.
SAVED	A program and directory or just a directory has been successfully written onto a Program-Only Tape and verified.

(cont.

Message and Code	Comments
SAVING DIRECTORY	The currently displayed directory (with a new entry if a program is being saved) is being written onto a Program-Only Tape.
SAVING PROGRAM	The program currently in the unit is being written onto either a Program-Data or Program-Only Tape.
TAPE BLOCK NOT FOUND (16)	The specified program recorded could not be found on the tape installed. This can occur if a Program-Data Tape is inserted while the Tape Directory Menu is displayed, if the tape drive has a mechanical problem, or if the program tape has lost data.
TAPE CHECKSUM ERROR TAPE CHECKSUM ERROR (17)	Logic could not read program from tape. For a Program-Only Tape, a checksum error has been detected on a program or directory stored on tape before load point. When this message appears several times after SAVE PROGram is operated the tape may be defective, or the tape head may need cleaning.
TAPE CONDITIONED	Retensioning of the tape installed has been completed.
TAPE CRC ERROR (18)	A program has been found in the specified program record of a Program-Only Tape, but a CRC error was detected during reading.
TAPE DCE BUFFER OVERFLOW (06) TAPE DTE BUFFER OVERFLOW (07)	See TAPE RECORD OVERRUN.
TAPE FORMAT ERROR -- INVALID BLOCK SIZE	Tape-to-RAM transfer attempted from tape other than INTERVIEW Program-Data data tape. Or defective tape (or tape read error).

(cont.)

Message and Code	Comments
TAPE IS OFF REEL (56)	The tape in the cartridge installed has either run off one of the reels or is positioned with a position detection hole directly over the hole sensor.
TAPE IS WRITE PROTECTED (02)	RECORD command has been given while tab on tape is in protected position.
TAPE IS WRITE PROTECTED (42)	An attempt has been made to save a program onto a tape with the tape tab in the protected position.
TAPE NOT INSTALLED (01) TAPE NOT INSTALLED (41)	Power-up display. Will also appear if tape load point hole is over tape hole sensor, or if tape operation has been attempted with no tape inserted.
TAPE PLAY OVERRUN (09) TAPE PLAY OVERRUN (10) TAPE PLAY OVERRUN (11) TAPE PLAY OVERRUN (12)	If EIA lead status has been recorded, maximum playback speed is 9.6 kbps.
TAPE POSITION ERROR (15)	Tape is positioned between two sets of warning holes at either the beginning or end of the tape. The situation may be corrected by making sure at least one set of double holes (beginning of tape) is wound onto the takeup reel (righthand reel) and then playing the tape from Block 000. (Error results from attempting to record or play from block other than zero if tape is stopped between beginning of tape and load point or beyond early warning at far end of tape.)
TAPE RECORD OVERRUN (08)	May be seen if operator tries to record interface lead status at 19.2 kbps. May be seen if Transmit and Receive data rates are not equal. Split-speed circuits may not be recorded and always generate TAPE OVERRUN error messages.

(cont.)

Message and Code	Comments
TAPE REWIND ATTEMPT FAILED (03)	Tape was found to be removed when a rewind was attempted.
TAPE STOPPED @ END	Indicates that STOP AT END has been selected and recording has stopped at end of tape.
TAPE STOPPED @ END: XXX BLOCKS TRANSFERRED	RAM-to-tape transfer has filled tape before all specified blocks have been transferred.
TAPE TO RAM TRANSFER MODE X FORMAT ERROR	X 1, 2, or 3. Tape block format does not match standard INTERVIEW data format. (Mode 1 is data only. Modes 2 and 3 are data with RS-232/V.24 information.)
TOO MUCH DATA RECEIVED	The record received is longer than specified by its header.
TRANSMISSION ABORTED	Displayed by destination INTERVIEW 30/40 when a Remote Transfer has been aborted by the same source unit.
TRANSMITTED	The INTERVIEW has finished sending a Remote Transfer.
TRANSMITTING	The INTERVIEW is transmitting a poll and looking to receive CTS ON. When CTS ON is received, a decrementing hexadecimal number will appear at the right of the Status field indicating that transmission is in progress.
VERIFYING DIRECTORY	The Program-Only Tape directory is being read back after being written to assure that it was written correctly.
VERIFYING PROGRAM	The program just written onto the tape is being read back to assure that it was written correctly.
XFER COMPLETE: XXX BLOCKS TRANSFERRED	RAM-to-tape or tape-to-RAM transfer successfully completed as specified.
XFER IN PROCESS: XXX BLOCKS TRANSFERRED	Displayed as transfer between tape and RAM is running. XXX is the count of blocks transferred from the SOURCE.

APPENDIX E
RACK MOUNT KIT

A Rack Mount Kit (INTER- VIEW option OPT-895-02-1) allows the INTERVIEW 4600 to be installed in a standard 19-inch wide equipment rack.

E.1 GENERAL DESCRIPTION

The kit will fit either standard vertical or sloped-front-panel, low-boy racks. Please note that, for proper installation, the rack must be equipped with a horizontal writing shelf (see Figure E-1).

The Rack Mount Kit offers the user four basic mounting styles:

1. Secure mounting, with flat keyboard position.
2. Secure mounting, with sloped keyboard position.
3. Slide-in/out mounting, with flat keyboard position.
4. Slide-in/out mounting, with sloped keyboard position.

Physical Specifications:
Height, 8.75 inches
Width, 19.0 inches
Depth, 17.4 inches
Weight, 20 lb
Material, Steel, with ABS plastic fittings

E.2 INSTALLATION

Installation is accomplished as follows:

1. Remove the carrying handle and detent mechanism from the INTERVIEW, following drawing TP-895-SA-43564.
2. Remove the top plate assembly from the rack mount kit.
3. Fit the INTERVIEW into the main frame of the rack mount kit.
4. Reinstall the top plate assembly.
5. Attach the two half-moon trim pieces.
6. Install the unit in the equipment rack.

Detailed, step-by-step instructions and exploded views are provided on drawings TP-895-SA-43564 and TP-895- 32178. Copies of these drawings are shipped with the Rack Mount Kit.

Total time for the installation should be less than one hour.

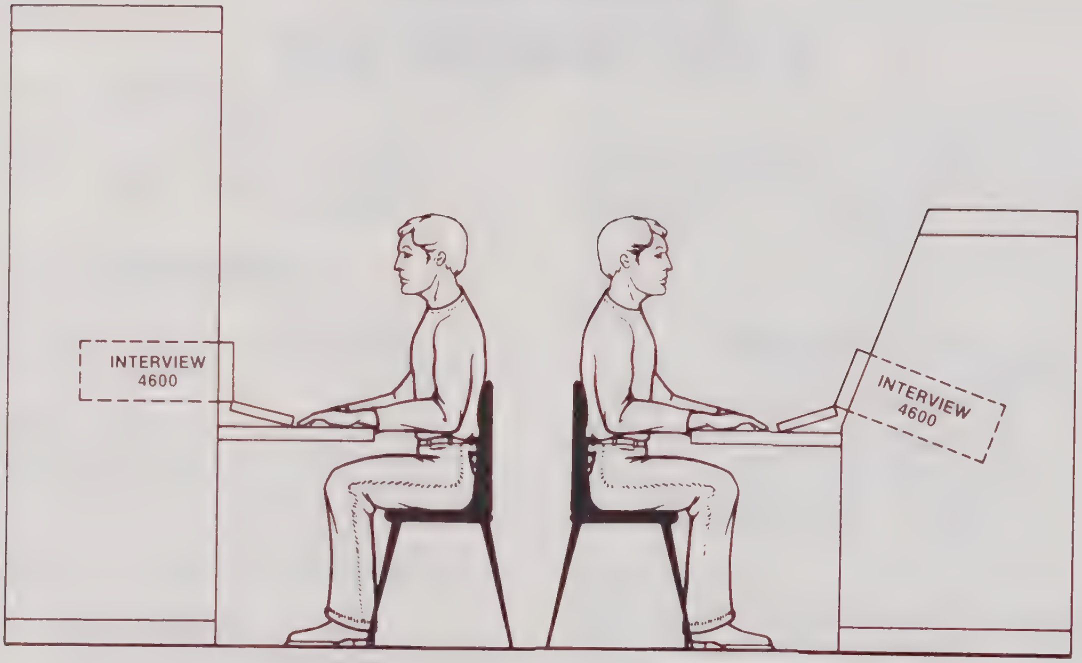


Figure E-1

APPENDIX F
ACRONYMS AND ABBREVIATIONS

ASYNC	ASYNChronous format (indicates START and STOP bits)
AUTOSYNC	Automatically recognizes synchronization pattern as 16-bit pattern
AUX	Auxiliary
BCC	Block Check Calculation
BDLC	Burroughs Data Link Control
BISYNC	Binary Synchronous Communications Protocol (IBM); also BSC
BLI	BLInk (CRT enhancement)
BOP	Bit-Oriented Protocols, e.g., HDLC, bit stuffing
bps	bits per second
BSC	See BISYNC
CCITT	Consultive Committee, International Telephone and Telegraph
CHARS	CHARacterS
CRT	Cathode Ray Tube
D	D bit (Bit 7 in Octet 3 of packet-level X.25)
DB-25	25-Pin D connector (standard for RS-232/V.24)

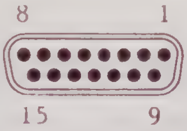
DC	Don't Care character (keyboard key); also Device Control
DCE	Data Circuit-Terminating Equipment (or Data Communications Equipment)
DEC	DECrement
DLE	Data Link Escape (used prin- cipally in transparent BISYNC)
DSR	Data Set Ready (RS-232/V.24 control lead)
DTE	Data Terminal Equipment
EIA	Electronic Industries Association
EM	Emulate
FDX	Full Duplex (permits simul- taneous data in both directions)
FCS	Frame Check Sequence (used in BOP)
Flag	HDLC 7E(hex) framing; the 4600's FLAG key
HDLC	High Level Data Link Control procedure
HDX	Half Duplex (data cannot be transmitted in both directions simultaneously)
HEX	Hexadecimal number; also the 4600's HEXadecimal key
Hz	Hertz
ID	IDentification
INC	INCrement
INFO	INFOrmation (usually refers to a type of frame)
kbps	Kilobits per second
LED	Light-Emitting Diode
LCN	Logical Channel Number (X.25 packet-level term)
LO	LOw intensity (CRT enhancement)
LRC	Longitudinal Redundancy Check
M	M bit (X.25 packet-level, Bit 4 of Octet 3)

MIL-188	Military Specification 188
MOD	MODulus (number of outstanding frames or packets, usually 8)
MON	MONitor mode
MSG	Message
N(R)	Number Received (frames)
NRZI	Non-Return to Zero Inverted (used with SDLC and ASYNC modems--sometimes with clocked modems)
N(S)	Number Sent (frames)
OUTSYNC	OUT of SYNChronization
P/F	Poll/Final bit used in control byte at frame level (X.25/SDLC)
P(R)	Packet Received
P(S)	Packet Sent
Q	Q bit (Bit 8 of Octet 1 in packet-level X.25)
RD	Received Data
REV	REVerse (black character on white background on CRT)
RLSD	Received Line Signal Detect (RS-232/V.24 signal)
RAM	Random Access Memory; the INTERVIEW 4600's high-speed memory option
ROM	Read Only Memory (firmware/software storage)
RS-232/V.24	List of definitions for interchange circuit between data terminal equipment and data circuit termination equipment established by EIA
SDLC	Synchronous Data Link Control (IBM); analogous to frame level

SNA	System Network Architecture (IBM)
SY, SYNC	Abbreviations for synchronization character in the code set (SY used in CRT font)
SYNC	SYNChronous format (as distinct from ASYNC or X.25 or SDLC)
TD	Transmitted Data
TP	Test Point
TX	Transmit Message
X.25	See HDLC
XFER	Transfer
XMIT	Transmit; transmission

APPENDIX G
AUXILIARY INTERFACE

The INTERVIEW 4600 has a 15-pin AUXILIARY interface on the rear panel. It is a female D-connector, numbered as follows:



Pin No.	Pin Name	Explanation
1	--	Not connected
2	AUX IN 2	No current use (not connected)
3	AUX IN 3	No current use (not connected)
4	AUX OUT 3	Follows Flag 8 (see Note 1)
5	--	Not connected
6	--	Not connected
7	Ground	--
8	Ground	--
9	AUX OUT 2	Follows Flag 7 (see Note 1)
10	AUX IN 1	No current use (not connected)
11	AUX OUT 1	Follows Flag 6 (see Note 1)
12	--	Not connected
13	--	Not connected
14	Ground	--
15	Ground	--

NOTE 1: Driven by a 74LS04. When Flag = 1, output is +3.5 V; when Flag = 0, output is 0 V.

APPENDIX H
COMMUNICATIONS WITH THE ARC TELEPRODUCTS FACTORY

H.1 RETURNING INTERVIEW OR SUBASSEMBLIES FOR REPAIR

H.1.1 Authorization

(1) The first step is always to call the ARC Teleproducts REPAIR CLERK in Springfield, Virginia: 703-644-9020.

(2) The Repair Clerk will give you a RETURN AUTHORIZATION NUMBER. This number should be posted on the outside of the package of all equipment returned for repair, and cited in all documentation, written correspondence, or telephone conversations concerning the specific repair.

(3) Turnaround time for repairs is usually two weeks in addition to transportation time. The Repair Clerk can arrange to furnish a rental unit if it is not practical for you to be without the INTERVIEW for that length of time. We can either include the rental fee on the repair bill or bill the rental fee separately.

H.1.2 Shipping

(1) Always include with the shipment a detailed description of the problem to be corrected. Put the assigned RETURN AUTHORIZATION NUMBER on this document.

(2) If the item is out of warranty, you should either --

(a) authorize the amount of the repair in dollars;

(b) request an estimate of the amount of the repair.

(3) Select suitable packing materials for electronic equipment containing a cathode ray tube, and pack the INTERVIEW with care. If possible, the carton and "clamshell" packing material in which you received the equipment should be used for returning it for repairs.

(4) Write the RETURN AUTHORIZATION NUMBER on the outside of the shipment.

(5) Address the shipment to

REPAIR DEPARTMENT
Atlantic Research Corporation
Teleproducts Division
7401 Boston Boulevard
Springfield, Virginia 22153
U.S.A.

(6) Ship PREPAID. No collect shipments will be accepted unless previously authorized by the Repair Clerk.

(7) Most repairs will be completed within two weeks, not including transportation time.

H.2 ORDERING REPLACEMENT PARTS OR ASSEMBLIES

To obtain price quotations or to order spare or replacement parts, contact the REPAIR CLERK by telephone, 703-644-9020.

The Repair Clerk will need to know the model designation of the unit, its serial number and software version, and what options are already installed in it.

H.3 PC BOARD OR SUBASSEMBLY EXCHANGES

Contact the REPAIR CLERK to arrange to exchange PC Boards or Subassemblies that need repairs. The Repair Clerk can arrange to send you the replacement part immediately. You will then be responsible for the list price value of the part until ARC has actually received the returned part.

H.4 FOR ANALYSIS OF PROBLEMS

For technical assistance with troubleshooting or other repair problems, call TECHNICAL SUPPORT ENGINEERING at 703-644-9040.

H.5 WARRANTIES

There is a standard warranty on all ARC Teleproducts equipment. This warranty is for 12 months on equipment delivered inside the USA; and for 14 months if the equipment is delivered outside the USA.

Extended Service Agreements are available on some equipment. Please contact the Repair Clerk, at 703-644-9020, for more information.

APPENDIX I
PACKING AND SHIPPING

The INTERVIEW 4600 is usually shipped either as baggage or as freight. The basic difference, of course, is in the quantity and quality of handling to which the INTERVIEW is subjected. It follows that different packing methods are called for.

When a unit is shipped as baggage, it will probably be subjected to much less severe treatment than when it is shipped by freight. Atlantic Research Corporation offers its INTERVIEW Option Padded Travel Bag, stock No. 37408, for this purpose. This bag has two inches of high-density foam protecting all surfaces of the INTERVIEW. It is yellow for easy identification among other luggage. An identification card case, FRAGILE markings, and leather appointments are standard features. Inside is a large pocket for carrying notes, manuals, and so forth.

Before packing the INTERVIEW in the carrying bag remove the tape from the drive. Fold the handle toward the bottom of the unit. Put cables and tapes in the top compartment of the INTERVIEW, but be sure that this compartment is not overpacked. The door should close and latch easily.

Don't overstuff the front pocket of the carrying bag. Only the manuals and the power cable should go in the front pocket. Pack it so the flat surface of the binder is against the bottom cover of the INTERVIEW. Objects such as connectors and plugs must not be packed between the binder and the INTERVIEW.

Put the INTERVIEW in the bag with the bottom of its case against the front pocket of the bag (as in Figure I-1). Secure the unit with the Velcro tapes; then close and secure the bag cover with its velcro closing.

> *CAUTION: The bag is considered to be reasonable protection for the INTERVIEW when it is shipped as baggage. However, it should never be used for freight shipment. Atlantic Research Corporation can assume no liability for damage to units shipped this way, owing to circumstances beyond our control.*

For freight shipment, the INTERVIEW should be packed in High Density Styrofoam "Clamshell" and a heavy-duty outer cardboard carton, as delivered by Atlantic Research. This packing system has been designed to give maximum reasonable protection to the INTERVIEW and ensure its safe arrival. However, damages due to mishandling must be the responsibility of the Carrier.

> NOTE: Please do not return any unit to Atlantic Research Corporation without prior authorization (see Appendix H).

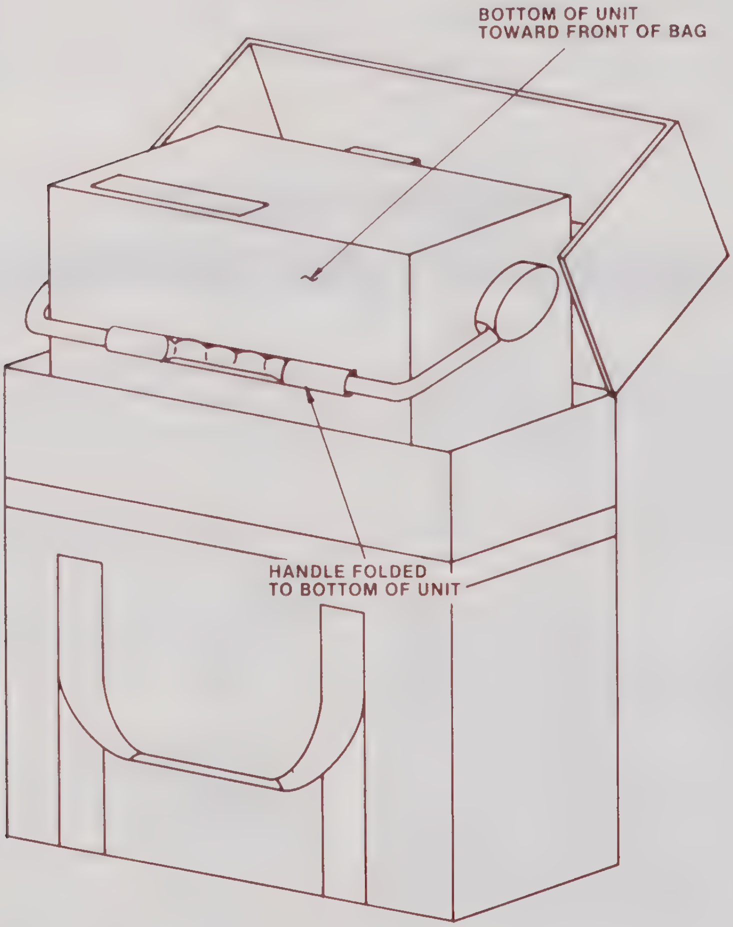

BOTTOM OF UNIT
TOWARD FRONT OF BAG
HANDLE FOLDED
TO BOTTOM OF UNIT

Figure I-1

APPENDIX J
ROUTINE SERVICE AND ADJUSTMENTS

The INTERVIEW 4600 requires very few adjustments and little routine service to assure satisfactory, trouble-free operation. This section describes the few procedures necessary. These procedures may be done by the operator under the supervision of a qualified electronics technician.

J.1 GENERAL CLEANING

The exterior surfaces may be cleaned with a soft damp cloth. Accumulations of dirt or fingerprints may be removed from the case or keyboard using a cloth dampened with a mild detergent. Do not use abrasive or solvent-type cleaners, which may damage the plastic surfaces.

J.2 VOLUME AND BRIGHTNESS ADJUSTMENTS

Volume and CRT brightness are easily adjusted by the operator to suit his particular operating environment or preferences. The speaker volume and CRT brightness controls are on the rear panel (see Figure J-1).

(a) Volume. The volume may be adjusted according to the background noise level at the work site. The volume control is mounted on the rear panel and has a knob for easy adjustment. This control adjusts the volume of the key confirmation and error tones and the trigger alarm. Rotating the volume control fully counterclockwise will silence the speaker.

(b) Brightness. The CRT brightness adjustment has been preset at the factory for optimum display brightness. If it becomes necessary to adjust the brightness, follow this procedure:

(1) Allow the CRT to warm up for at least 5 minutes.

(2) Depress the RUN key, and then the SELF TEST key. The display should appear as in Figure J-2. (The Parameters 1 menu CODE selection is unimportant for this purpose.)

(3) The brightness control is located on the rear panel (see Figure J-1) next to the power connector-fuse holder. A small screwdriver is needed to turn it.

Observing the display, increase the brightness until defocusing occurs.

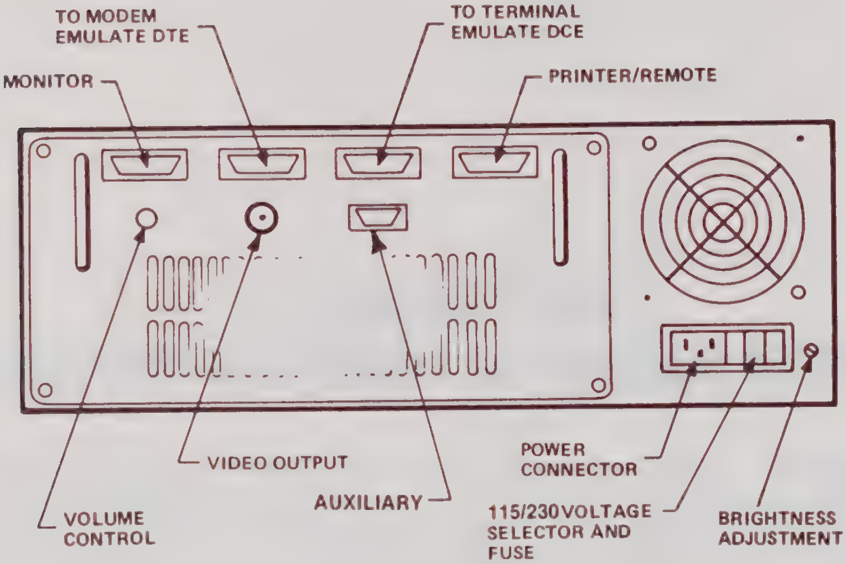


Figure J-1 Rear panel of INTERVIEW 4600.

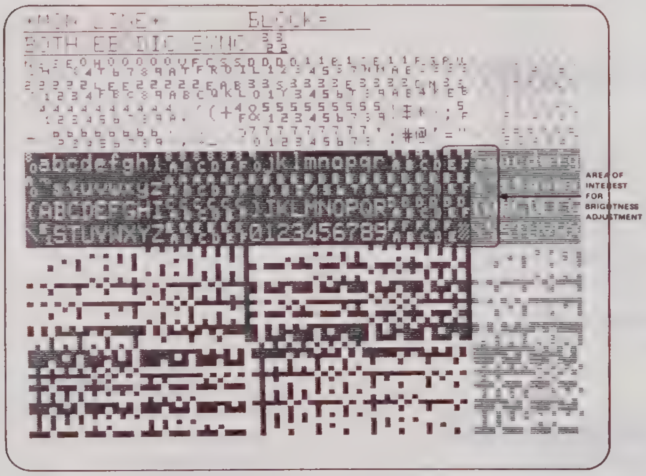


Figure J-2 Self Test display showing area of interest for brightness adjustment.

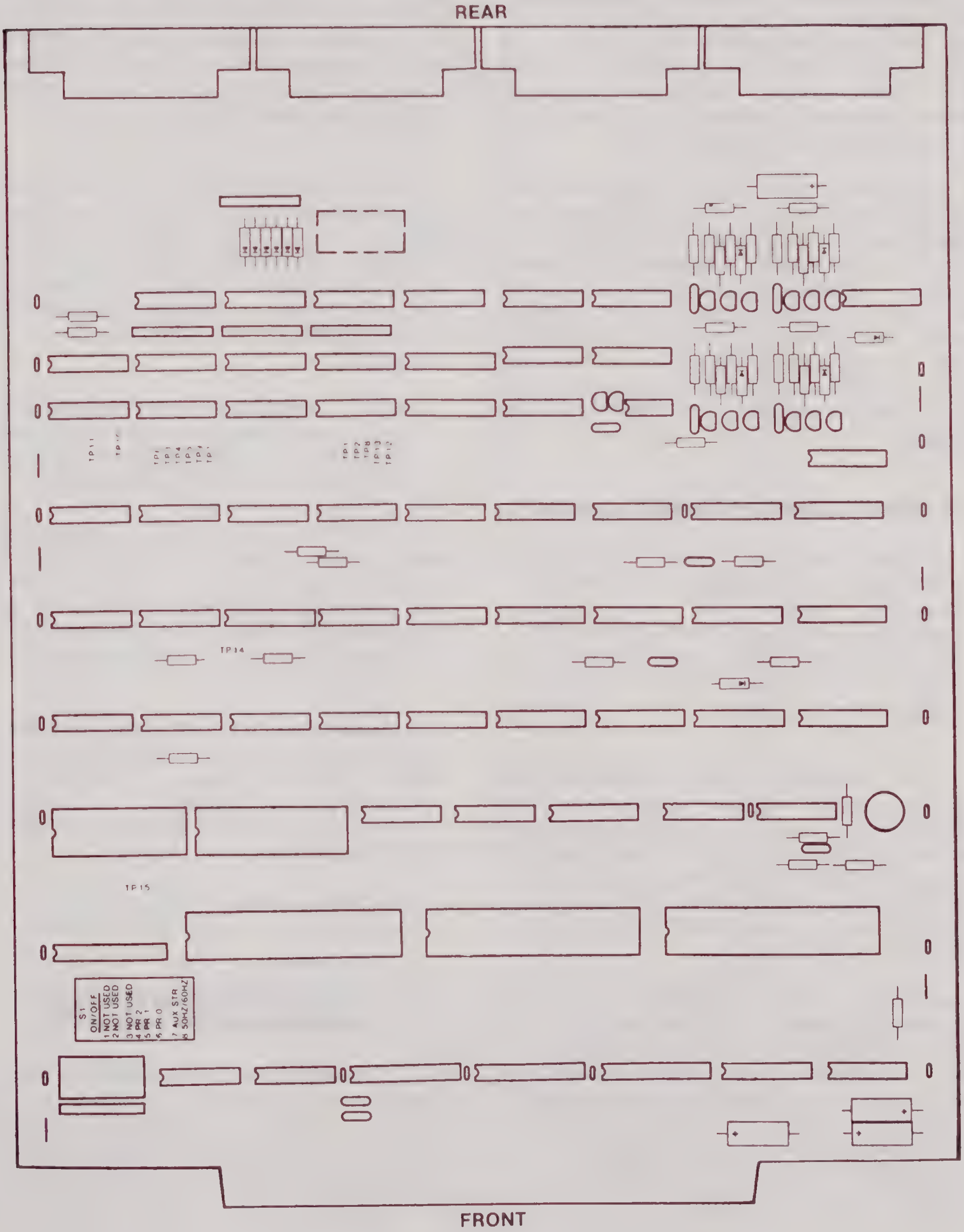


Figure J-3 INTERVIEW 4600 Line Interface Module (Board A).

This will be most noticeable in the area of high-intensity reverse-image characters and along the edge between this area and the low-intensity area to the right of it (the area circled in Figure J-2). The edge of the high- intensity reverse area will appear to bleed into the low-intensity reverse area.

(4) Now back the brightness adjustment down just to the point that the defocusing or bleeding is eliminated. This is the maximum usable brightness setting. A higher setting will degrade the clarity of the display. If a lower setting is desired for a low ambient light environment, be careful not to reduce the brightness to the point that the low-intensity characters are illegible.

J.3 INTERNAL SWITCHES AND STRAPPING

CAUTION: Setting the internal switches or strapping the user-assigned lead on the Line Interface Module (Board A) should be performed only under supervision of qualified service personnel.

(a) Removing and Replacing the Line Interface Module. Disconnect the INTERVIEW's power cord. Loosen the four captive fasteners on the rear panel of the unit (Figure J-1); then pull out the panel and its attached board (Board A), sliding it in parallel with the top cover.

Before you replace the Line Interface module, check to see that the other PC boards are correctly seated in their connectors and card guides, and then install the line interface module, as follows: With the component side of Board A on top, slide the board squarely and gently into its card guides until the edge connector seats. If it does not seat easily, do not force the board in head on, but use alternate pressure on the handles at the right and left edges of the rear panel. When the board is engaged in its card guides and properly seated in the connector, tighten the captive screws.

(b) Switch S1. The settings of internal switch S1 on the Line Interface Module, should be checked before the INTERVIEW is operated. Switch S1 is located near the front of Board A (see Figure J-3). Compare this switch against Table J-1 for proper switch settings.

NOTE: Changing the power frequency setting (Switch S1-8) sometimes necessitates adjustment of the CRT vertical hold (see Appendix K).

(c) Strapping the User-Assigned Lead and Status Indicator. The User-Assigned lead can be strapped to any one of 13 RS-232/V.24 pins using test points on Board A. Remove the Line Interface Module as explained above.

Locations of the test points are shown in Figure J-3; Table J-2 correlates test point numbers with RS-232/V.24 pin numbers. Wire-wrap TP 14 to the desired test point using 28- or 30-gauge insulated wire.

CAUTION: Never connect TP 14 to more than one other test point.

J.4 PREVENTIVE OR ROUTINE MAINTENANCE OF TAPE DRIVE

The tape head and capstan should be cleaned at least every 8 hours of tape motion. The recording technique, however, prevents the tape from continuous motion during recording or playing back.

Table J-1
Line Interface Module Strapping for
User-Assigned Input Lead

Pin No.	Connect TP 14 (Common) to
9	TP 1
10	TP 2
11	TP 3
12	TP 4
13	TP 5
14	TP 6
16	TP 7
18	TP 8
19	TP 9
21	TP 10
23	TP 11
24	TP 12
25	TP 13

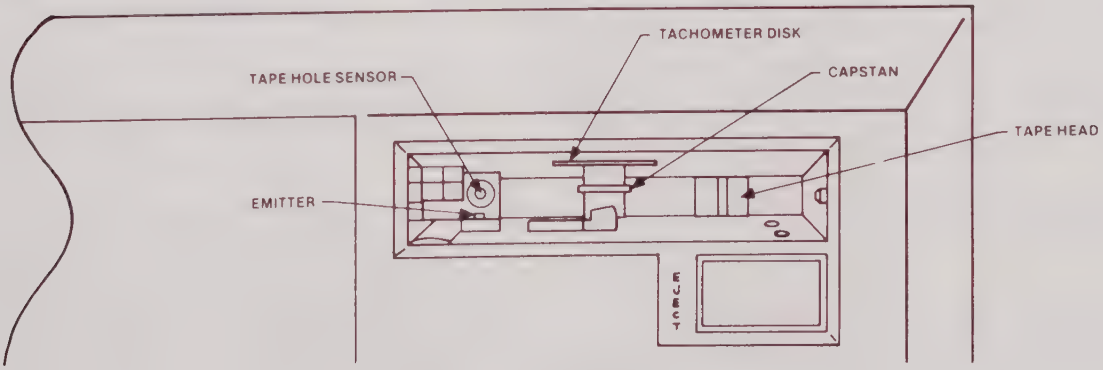


Figure J-4 Tape cartridge window.

In normal use at low data rates, monthly cleaning should be adequate. On the other hand, if the tape is used 24 hours a day at high data rates, daily cleaning may be necessary. Frequent visual inspection of the tape head is recommended under any operating conditions. The tape head can be seen easily through the cartridge window when the tape cartridge is removed. If inspection reveals any accumulation of oxide or dirt, the tape head should be cleaned. The tape hole sensor should be cleaned at the same time.

(a) Tape Head Cleaning. The tape head and capstan can be cleaned by reaching through the cartridge window. See Figure J-4.

CAUTION: The tape drive cover is labeled with the warning not to touch the metal timing disc. Do not attempt to clean the tachometer disc, and do not touch or bend the disc while cleaning the head or other parts of the drive.

Clean the tape head and capstan (the rubber drive wheel under the tachometer disk; see Figure J-4) with a cotton swab moistened with isopropyl alcohol or Miller-Stephenson Magnetic Tape Head Cleaner. Other solvents may damage the tape head or capstan.

CAUTION: Do not use rubbing alcohol, acetone, lacquer or paint thinners, or aerosol sprays.

Do not use an excessive amount of solvent and do not allow the solvent to reach the capstan bearings since this will destroy their lubrication.

CAUTION: Under no circumstances should the tape head mounting be moved since this will affect the operation of the recorder.

(b) Tape Hole Sensor Cleaning. The tape hole sensor can be cleaned by reaching through the cartridge window (see Figure J-4). Any accumulation of dirt or dust on the lenses of both the emitter and the sensor should be cleaned with a soft brush or cotton swab. If the tape hole sensor is not cleaned at least once per month, a tape may run off its reel.

APPENDIX K

TROUBLESHOOTING AND ADVANCED MAINTENANCE PROCEDURES

With the exception of the user adjustments described in Appendix J, all electrical adjustments are preset at the factory and should require readjustment only after extended periods of operation. The adjustments and other procedures described in this appendix should only be performed if there is good reason to believe they are required, and they should be attempted only by qualified service personnel.

If you need to contact Atlantic Research Corporation for further maintenance information or to return a part for repair, please follow the procedures explained in Appendix H.

K.1 POWER-UP SELF TESTS; COMPONENT EXCHANGES

CAUTION: There is no need to remove the top cover to check or exchange any of the boards referred to in this section.

Table K-1 lists the source and probable cause of each error code that may appear on the power-up display of the 4600. All the logic boards referred to in the table are accessible through the rear of the unit as described in Appendix J.3(a). Correct installation of the boards is shown in Figure K-1.

When an error code and subsequent check indicate that a PC logic board is defective, the best way to confirm the diagnosis is to insert another board of the same revision level, either a spare or one from another INTERVIEW 4600. If this corrects the problem, the defective board can be returned to Atlantic Research Corporation for service.

> NOTE: Do not return any unit or components to Atlantic Research Corporation without prior authorization.

When the probable cause is a defective or missing ROM, check first that all ROMs on the board are of the correct revision level. Then substitute ROMs known to be of the correct revision level using spares or borrowing from another unit. (Check with Atlantic Research Corporation if you are in doubt about the correct revision level.)

CAUTION: Remove and install ROMs carefully to avoid bending the pins.

If you can identify the defective ROM, order the replacement. If necessary make arrangements with ARC to return the board for service.

TABLE K-1

SELF-TEST ERROR CODES

Code	Board	Possible Causes	Action
32	C	Defective processor RAM	Exchange board; return for service.
34	C	Incorrect ROM installed	Check for correct revision of all ROMs, board C.
		ROM missing	Check all ROMs, board C. Order correct revision level.
		Defective ROM	Exchange ROM; return for service.
40	D	Board not seated in connector or in wrong slot	Check that all boards are in correct slot and properly seated.
		Board defective	Exchange board; return for service.
42	D	Defective processor RAM	Exchange board; return for service.
44	D	Incorrect ROM installed	Check for correct revision of all ROMs, board D.
		ROM missing	Check all ROMs, board D. Order correct revision level.
		Defective ROM	Exchange ROM; return for service.
48	D	Incorrect software	Check for correct revision of all ROMs, board C and D.
		Board defective	Exchange; return for service.
60	F	Board not seated in connector or in wrong slot	Check that all boards are in correct slot and properly seated.
		Board defective	Exchange board; return for service.
		Connector between Boards F and G not tight or Board G not properly seated.	Check ribbon connector between the boards; check that Board G is seated tightly.
62	F	Defective processor RAM	Exchange board; return for service.
64	F	Incorrect ROM installed	Check for correct revision of all ROMs, board F.
		ROM missing	Check all ROMs, board F. Order correct revision level.
		Defective ROM	Exchange ROM; return for service.
68	F	Incorrect software	Check for correct revision of all ROMs on boards C and F.
		Board defective	Exchange board; return for service.
72	G	Defect in optional High-Speed Memory (data-storage RAM)	See Section K.3 for RAM self-test procedure.
NO CIM SYNC	D	Board D not properly seated in connector.	Board has been unable to complete minimum initialization necessary to perform power-up tests.
		Defective, incorrect, or incomplete set of ROMs. Board D defective.	Must be corrected before any further testing is possible.

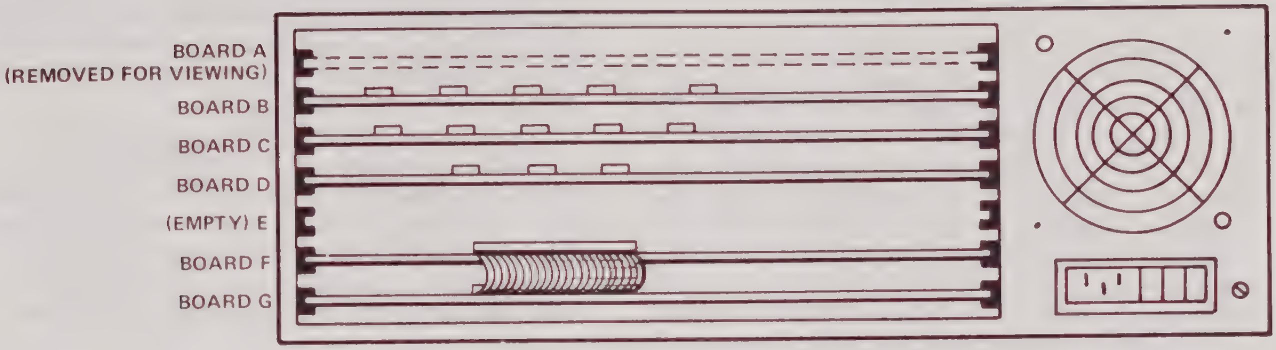
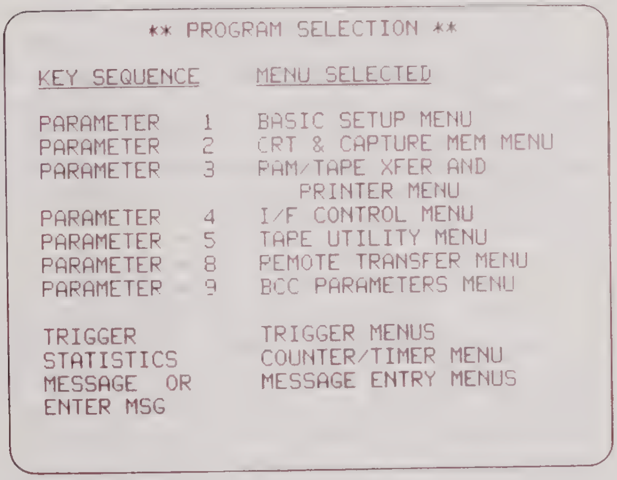


Figure K-1 Rear of INTERVIEW 4600 with Line Interface Module (Board A) removed.



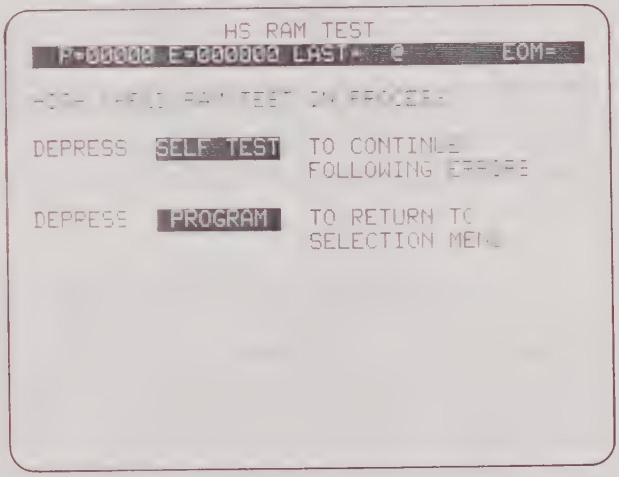
```
           ** PROGRAM SELECTION **

KEY SEQUENCE       MENU SELECTED

PARAMETER    1     BASIC SETUP MENU
PARAMETER    2     CRT & CAPTURE MEM MENU
PARAMETER    3     RAM/TAPE XFER AND
                      PRINTER MENU
PARAMETER    4     I/F CONTROL MENU
PARAMETER    5     TAPE UTILITY MENU
PARAMETER    8     REMOTE TRANSFER MENU
PARAMETER    9     BCC PARAMETERS MENU

TRIGGER            TRIGGER MENUS
STATISTICS         COUNTER/TIMER MENU
MESSAGE   OR       MESSAGE ENTRY MENUS
ENTER MSG
```

Figure K-2



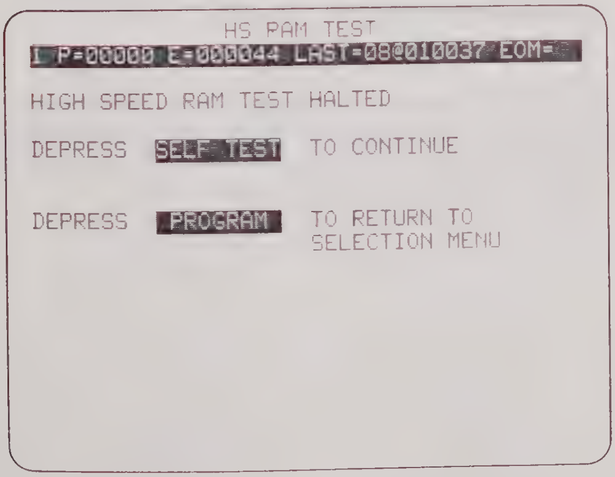
```
                 HS RAM TEST
 P=00000 E=000000 LAST=   @            EOM=

HIGH SPEED RAM TEST IN PROCESS

DEPRESS  SELF TEST  TO CONTINUE
                    FOLLOWING ERRORS

DEPRESS   PROGRAM   TO RETURN TO
                    SELECTION MENU
```

Figure K-3



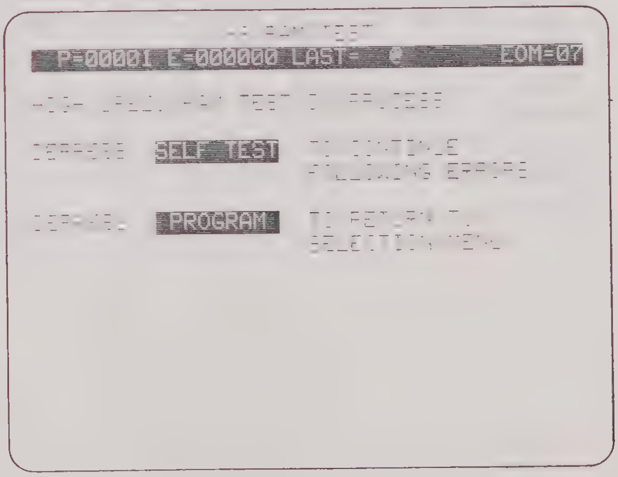
```
                 HS RAM TEST
I P=00000 E=000044 LAST=08@010037 EOM=

HIGH SPEED RAM TEST HALTED

DEPRESS  SELF TEST  TO CONTINUE

DEPRESS   PROGRAM   TO RETURN TO
                    SELECTION MENU
```

Figure K-4



```
                 HS RAM TEST
 P=00001 E=000000 LAST=   @            EOM=07

HIGH SPEED RAM TEST IN PROCESS

DEPRESS  SELF TEST  TO CONTINUE
                    FOLLOWING ERRORS

DEPRESS   PROGRAM   TO RETURN TO
                    SELECTION MENU
```

Figure K-5

K.2 CRT DISPLAY

Board B is the CRT Driver Board. If the CRT display does not come up, connect a video monitor to the output on the rear of the unit. If you obtain a display on the auxiliary monitor, the fault is probably in the CRT or its immediate area; if no display appears, replace Board B with another of the correct revision level. If this solves the problem, make arrangements with ARC to return the defective board for service.

K.3 HIGH-SPEED MEMORY OPTION SELF TESTS

During power-up the 4600 writes data into the RAM and verifies it. A Series 70 error code on the power-up display indicates that a RAM error has been found. To localize the source of the error, conduct the following self tests.

(a) Procedure: Manually Controlled Test. Press Program to display the Program Selection menu (Figure K-2); then press the green SELF TEST key. This displays the HS RAM TEST menu shown in Figure K-3 and starts the self tests. RAM test status is shown on the second line of this menu.

When the logic finds a RAM error, it halts the test and replaces the message HIGH SPEED RAM TEST IN PROCESS with HIGH SPEED RAM TEST HALTED (see Figure K-4). This allows you to record the status information for the last error found before the test is continued. Press SELF TEST again to continue the test.

The memory board contains two types of logic: Mode 1 logic and Mode 2 logic. Each test pass consists of four steps: Mode 1 write and read; and Mode 2 write and read.

(b) Procedure: Free-Running Test. If you press the SELF TEST key a second time before the test halts on an error, the test will run continuously until you press the PROGRAM key, unless it encounters an EOM or a page select error.

Sections (c) through (h) explain the information given on the test status line in detail.

(c) Mode. When an error is found, the logic mode in which it was found is put up in the first character position of the status line. In Figure K-3, this position is vacant because no errors have been found; in Figure K-4, the error was found in Mode 1.

(d) Pass Count. The Pass Count is a decimal number. Each time the test logic makes one pass (Mode 1 and Mode 2) through the memory, the Pass Count (P) increments (compare Figure K-3 with Figure K-5). Each pass takes about 12 seconds for the 1-Megabit RAM, or about 40 seconds for a 4-Megabit RAM. This count is cumulative until the test is reinitialized by pressing the PROGRAM and SELF TEST keys again.

(e) Error Count. The Error Count is a decimal number that increments each time an error is found until the test is initialized (Figure K-4).

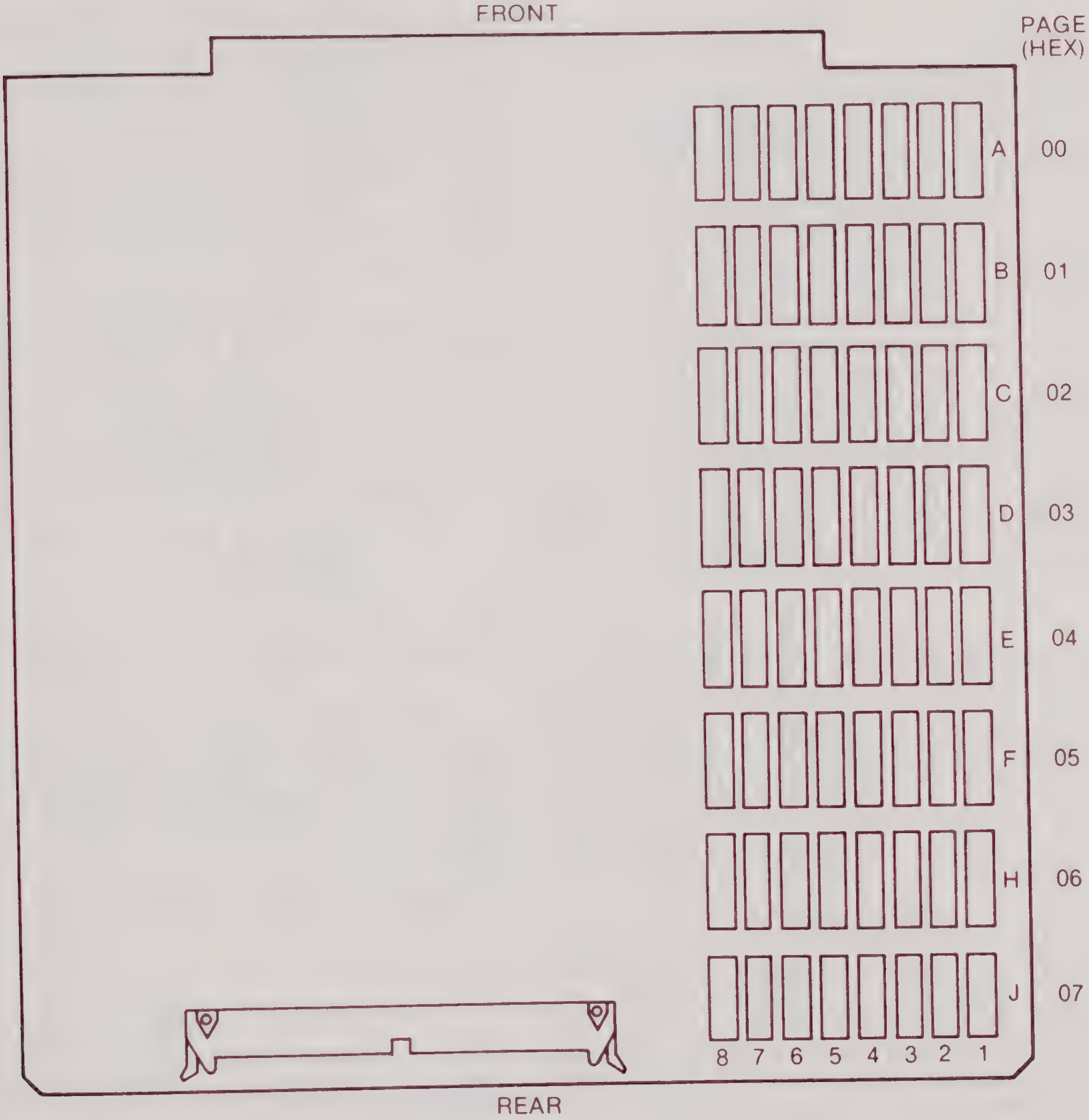


Figure K-6 Board G: 1-Megabit RAM addressing.

(f) Address of the Last Error Found. The specific address of the last error found is given by LAST = ww @ xxyyyy.

The first two digits after LAST, ww, are the hexadecimal value of the bit mask formed by the column addresses in which errors have been found. Figure K-6 shows the column numbers of the chips on the a 1-Megabit memory board (Board G); Figure K-7 shows the addressing on a 4-Megabit memory board. Column 1 is the low-order bit; column 8, the highest-order bit in the mask. An error in a column is represented by a 1 in its position in the mask. A value for ww of 0A (hex), as shown in Figure K-8, represents the binary number 0000 1010. This indicates that errors were found in columns 2 and 4 of Board G. (The logic arrives at the error mask by taking the exclusive OR of Data Written and Data Read in either Mode 1 or Mode 2.)

The hexadecimal page address is given by the first two digits after the @ sign, xx. For the 1-Megabit RAM, this value can range from 00 through 07 (hex), which corresponds to Rows A, B, C, D, E, F, G, and H, respectively, on Board G (see Figure K-6). For the 4-Megabit RAM, the address ranges from 00 to 1F (hex) as shown in Figure K-7.

The hexadecimal bit address within the page is given by yyyy. The range for this value for either 1-Megabit or 4-Megabit RAM is 0000 to 3FFF (hex). The bit address changes each time the logic finds an error, and thus shows how many errors there are at any particular page and column location.

Using this column and row information, you can locate the specific RAM chip at fault.

(g) End of Memory Found. After each pass, the last page of memory found will be displayed in hexadecimal at the far right (EOM, or End of Memory; Figure K-5). For the 1-Megabit RAM option, the only valid EOM value is 07 (hex) (Figure K-6) because there are eight pages of memory. For the 4-Megabit RAM (which has 32 pages; see Figure K-7), EOM should be 1F (hex).

During normal operation, End of Memory is detected by logic on Board G. This logic is tested during both the write and read test cycles. If the End of Memory values detected within one pass are inconsistent the following message appears on the RAM status line:

```
WRITE PASS EOM = XX : READ PASS
 EOM = YY
```

The values XX and YY are in hexadecimal and may range from 00 to 1F (hex).

To record or play back from any block other than 000, the 4600 uses Page Address Select Logic. This logic is also tested during the self tests. If a malfunction is found, the following message appears:

```
BOARD  G  MODE 1  PAGE ADDRESS SELECT
  ERROR
```

(h) Counter Overflow. When the Pass or Error Counter has overflowed, the equal sign (=) in the status line is replaced by a "pound" sign (#).

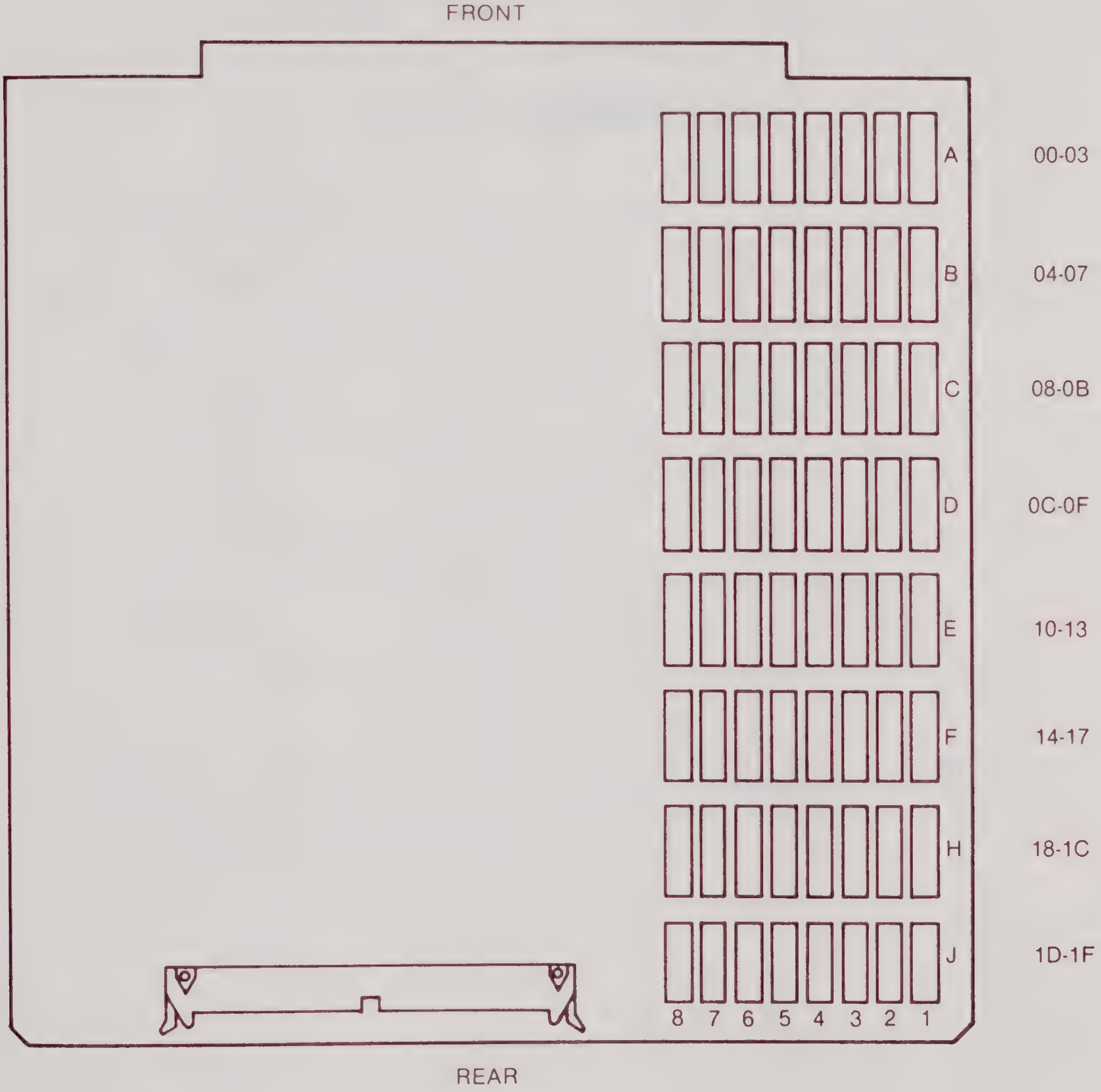
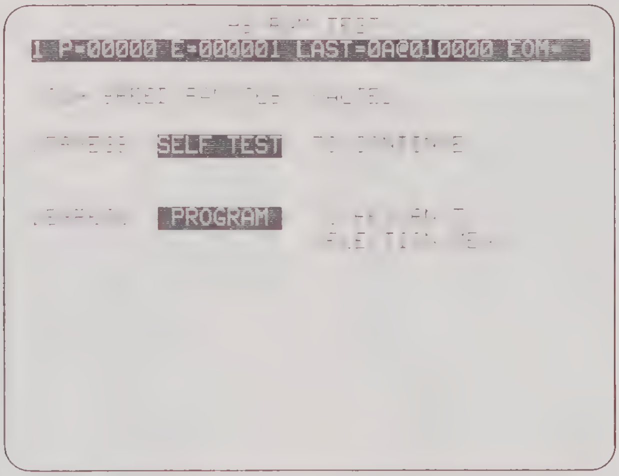


Figure K-7 Board G: 4-Megabit RAM addressing.



```
[illegible]
1 P=00000 E=000001 LAST=0A@010000 EOM=

[illegible]

[illegible]  SELF TEST  TO CONTINUE

[illegible]  PROGRAM  [illegible]
```

Figure k-8

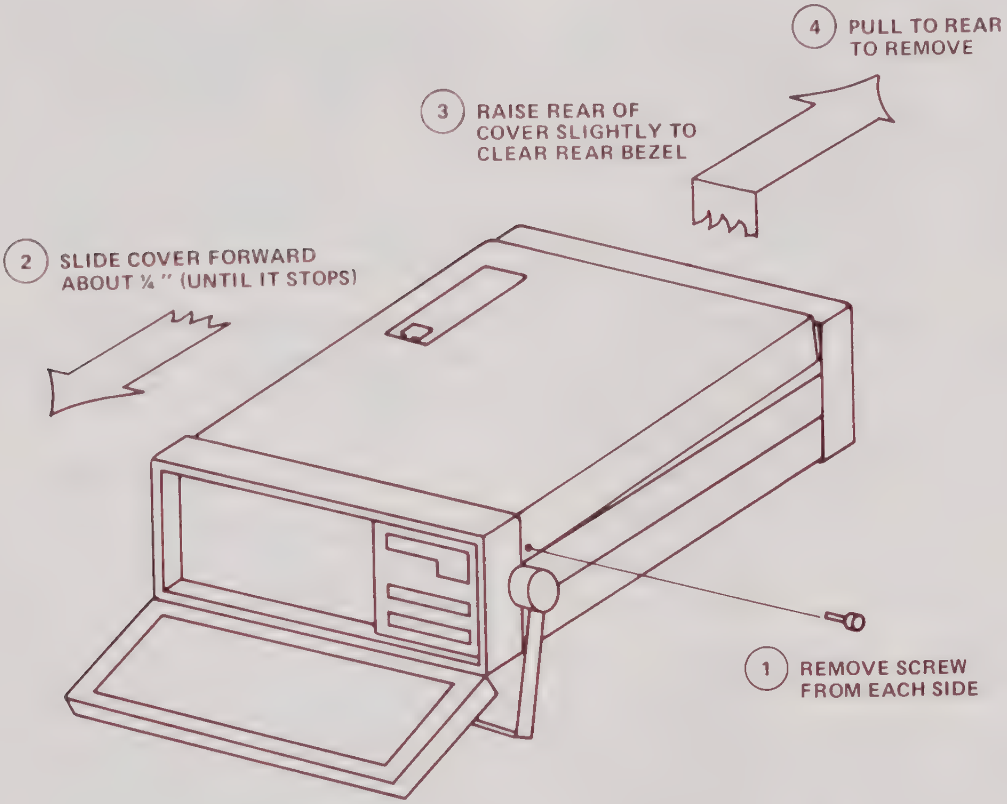

④ PULL TO REAR TO REMOVE
③ RAISE REAR OF COVER SLIGHTLY TO CLEAR REAR BEZEL
② SLIDE COVER FORWARD ABOUT ¼ " (UNTIL IT STOPS)
① REMOVE SCREW FROM EACH SIDE

Figure K-9 Removing the top cover of the INTERVIEW 4600. To remove the bottom cover, follow the same procedure with the unit turned upside down. To replace the cover, reverse the procedure, sliding the cover into the front bezel first.

K.4 REMOVING TOP (AND/OR BOTTOM) COVER

WARNING: Removal of the top or bottom cover of the INTERVIEW 4600 whether or not the power cord is connected may expose personnel to dangerous high voltages and high-vacuum CRT hazard. Under no circumstances should anyone but qualified service personnel remove either cover or attempt any kind of repair.

CAUTION: Read these instructions carefully before you attempt to remove the blue top or bottom cover of the INTERVIEW 4600. The covers are held in place by white plastic bezels which may crack if the cover is removed incorrectly.

Refer to Figure K-9 as you read the following procedure:

(1) Always disconnect the power cord before removing either cover.

(2) The two screws securing the top cover to the chassis are located adjacent to the handle detent mechanisms on either side of the front of the unit. Remove these two screws.

CAUTION: Raising the cover more than 1/4 inch during removal or replacement may cause the bezel to deform or crack. The proper procedure requires no force.

(3) Gently slide the top cover toward the front of the instrument (about 1/4 inch of movement) until it stops.

(4) Slightly raise the rear of the top cover, just enough so the edges clear the rear bezel. Hold it in this position while you spread the sides of the cover to clear the sides of the bezel. Then slide the cover to the rear (about 1/2 inch of movement) until it frees itself from the front bezel.

(5) Lift the cover off the instrument. To replace the cover, reverse the procedure, sliding the cover into the front bezel first.

To remove the bottom cover, turn the unit upside down and follow the same procedure as for the top cover.

K.5 CRT ADJUSTMENTS

CRT adjustments should only be performed if there is good reason to believe they are required. In order to make the adjustments, the INTERVIEW must be operated with the top cover removed and the adjustments must be performed in an area that exposes service personnel to dangerous high voltages and the hazards of the high-vacuum CRT. Also, while the covers are removed there is great danger of overheating the 4600 with the possibility of permanent damage. Thus, the following procedures should be performed only by thoroughly qualified personnel in strict accordance with these instructions.

K.5.1 Equipment

To make CRT adjustments, you will need a screwdriver and a clip lead.

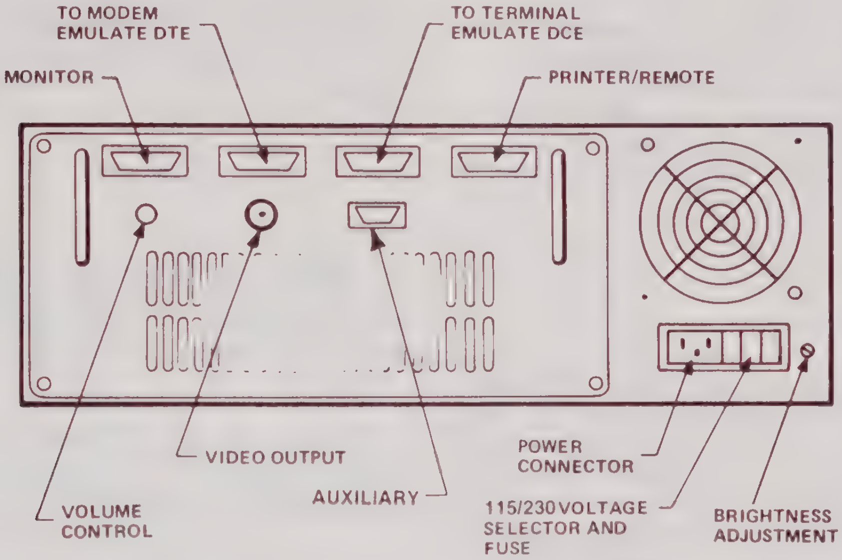


Figure K-10 Rear panel of the INTERVIEW 4600.

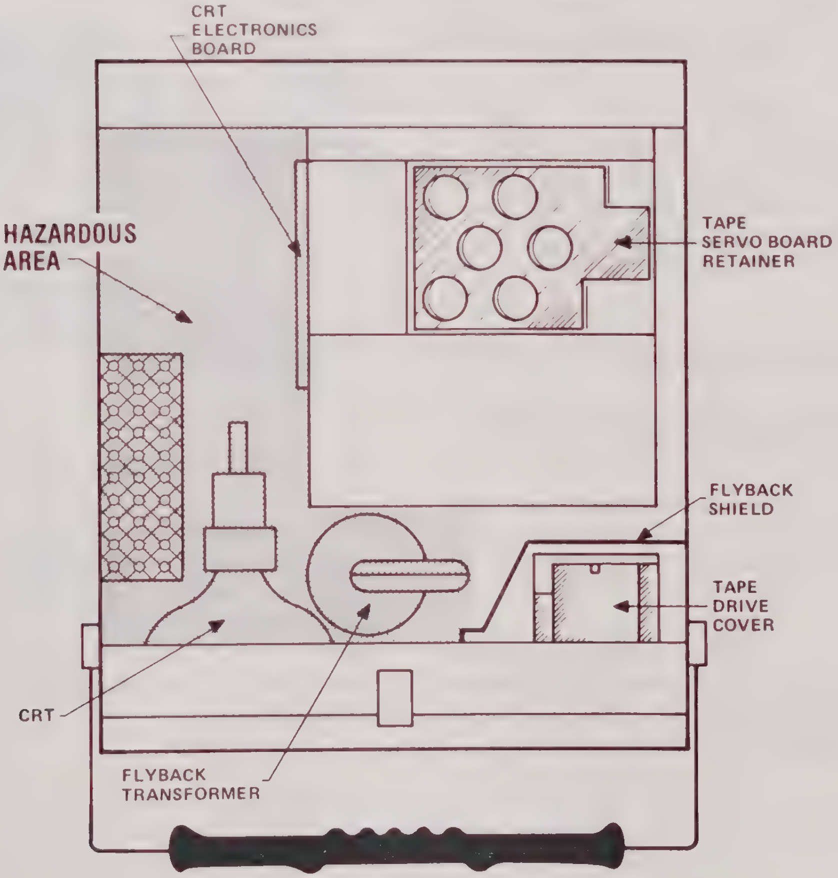


Figure K-11 INTERVIEW 4600 with top cover removed. Tape Servo Board is under the Tape Servo Board Retainer.

WARNING: Removal of either cover of the INTERVIEW 4600 with or without the power cord connected exposes personnel to dangerous high voltages and high vacuum CRT hazard. Under no circumstances should anyone but qualified service personnel remove the top cover or attempt any kind of repair.

K.5.2 Warmup

CRT adjustments can be done more precisely if the 4600 is first allowed to warm up for 5 to 10 minutes with the cover in place. A longer warmup period should be allowed if the unit has been stored or transported at temperatures substantially below or above normal operating temperature.

Remove the top cover in accordance with the instructions in Section K.4.

CAUTION: Operation of the INTERVIEW with the top cover removed exposes the unit to the possibility of damage due to overheating. Keep operating time to a minumum while the cover is off.

K.5.3 Background Brightness Adjustment

(1) With the top cover removed, power up the INTERVIEW 4600.

(2) Using the brightness control on the rear panel (see Figure K-10), adjust the CRT brightness to a minimum so that no data is visible.

(3) With a screwdriver, adjust BRIGHTNESS on the CRT Electronics Board (see Figures K-11 and K-12) clockwise until you see the CRT raster pattern.

(4) Back down the adjustment (counterclockwise) until the raster just disappears. Then readjust the rear panel brightness control as explained in Appendix J.

K.5.4 Vertical Hold

After the frequency setting (Switch S1-8) has been changed from 60 to 50 Hz or vice versa, the CRT display may roll. To correct this, do the following:

(1) Set the switch S1-8 on Board A (Line Interface Module) to the power line frequency desired.

(2) Operate the red PROGRAM key.

(3) With a screwdriver, turn the Vertical Hold adjustment on the upper, rear corner of the CRT Electronics Board (see Figure K-12) until the display stops rolling.

If no further adjustments are to be made, disconnect the power immediately and replace the cover.

K.5.5 Other Adjustments

A qualified electronics technician may make other standard adjustments to the CRT, such as display rotation, centering, height, width, or linearity. If the need arises, contact Atlantic Research Corporation for further information.

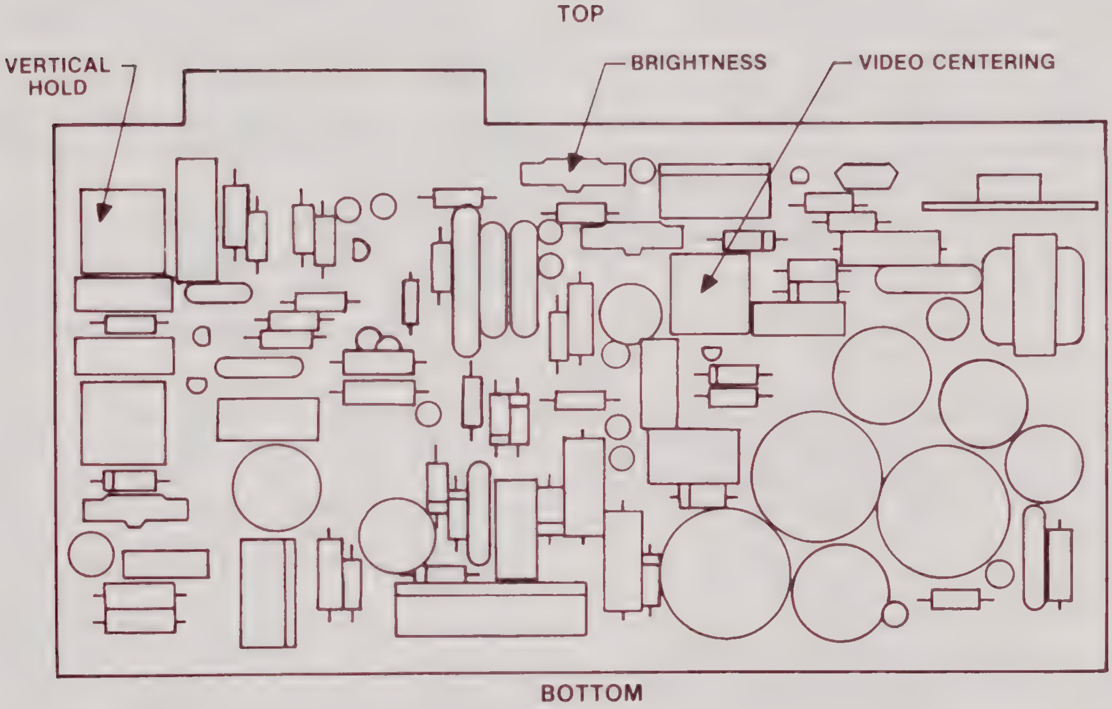


Figure K-12 Diagram of CRT Electronics Board. For location of this board in the unit, see Figure K-11.

K.6 CALIBRATION OF THE TAPE DRIVE

Calibrations should be performed only if there is good reason to believe that they are required. In order to make the adjustments, the INTERVIEW must be operated with the top and bottom covers removed. This exposes service personnel to dangerous high voltages and the hazards of the high vacuum CRT. While the covers are removed, there is also great danger of overheating with the possibility of permanent damage. Thus, the following procedures should be performed only by thoroughly qualified personnel in strict accordance with these instructions.

K.6.1 Equipment

You will need a frequency counter, an oscilloscope, a new blank tape cartridge, and a tape cartridge with recorded data (training tape).

K.6.2 Removing the Covers

Remove the top and bottom covers in accordance with the procedure in Section K.4.

> *CAUTION: Operation of the INTERVIEW with the top and (or) bottom covers removed exposes the unit to the possibility of damage due to overheating. Keep operating time to a minimum while the covers are off.*

K.6.3 Tape Speed Adjustment

(1) Remove the tape servo board retainer (see Figure K-11).

(2) Insert a new blank tape in the drive.

(3) Connect the frequency counter common ground to the chassis.

(4) Connect the frequency counter input to TP 5 on the tape servo board (see Figures K-13a and K-13b).

> NOTE: The tape servo board in your unit may be similar to either Figure K-13a or K-13b.

(5) Power up the unit. Press PROGRAM; then PARAMETERS and (numeral) 1.

(6) Select TAPE on the SOURCE line; then use the ENTER key to get to the SPEED line and enter (numerals) 9600. The menu should look like Figure K-14.

(7) Press the RUN key once. The tape should rewind and then run continuously forward. If the tape starts and stops, it has been recorded and cannot be used for this purpose. A blank tape must be used to set tape speed.

(8) The frequency counter should indicate 7900 +/-150 Hz. This measurement must be made while the tape is moving continuously forward. If the tape reaches the end and stops before the reading is obtained, operate the PROGRAM key and the RUN key to rewind and restart the tape.

> NOTE: The tape should not be adjusted while rewinding.

(9) If necessary, use a screwdriver to adjust R29 on the tape servo board (Figure K-13a or K-13b) to obtain a reading of 7900 +/-150 Hz. The frequency will vary somewhat over the length of the tape, but should remain within the +/-150 Hz tolerance. The tape speed is set at the factory to be as close as possible to 7900 Hz in the middle of the tape after the counter reading has stabilized.

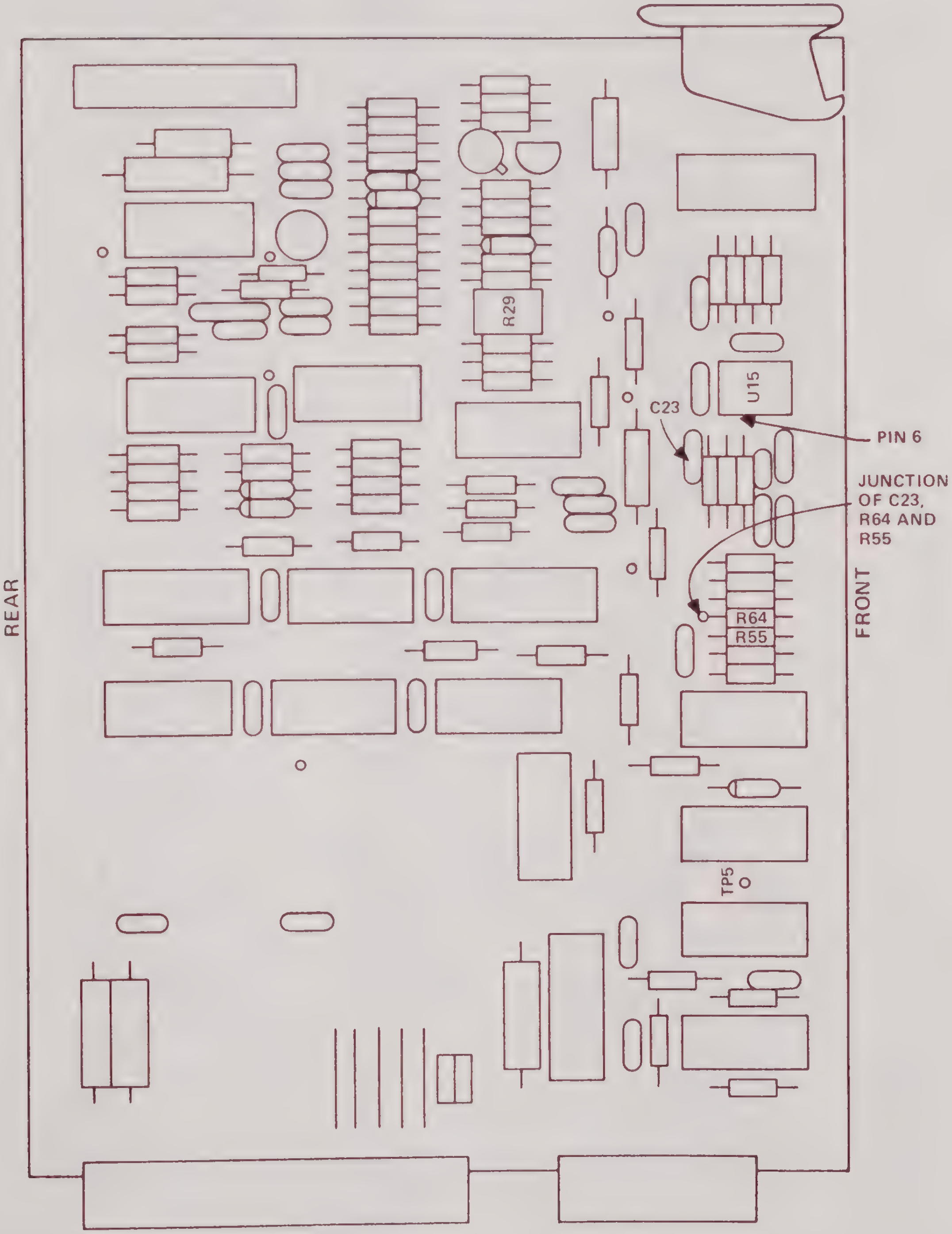


Figure K-13a Diagram of Tape Servo Board.

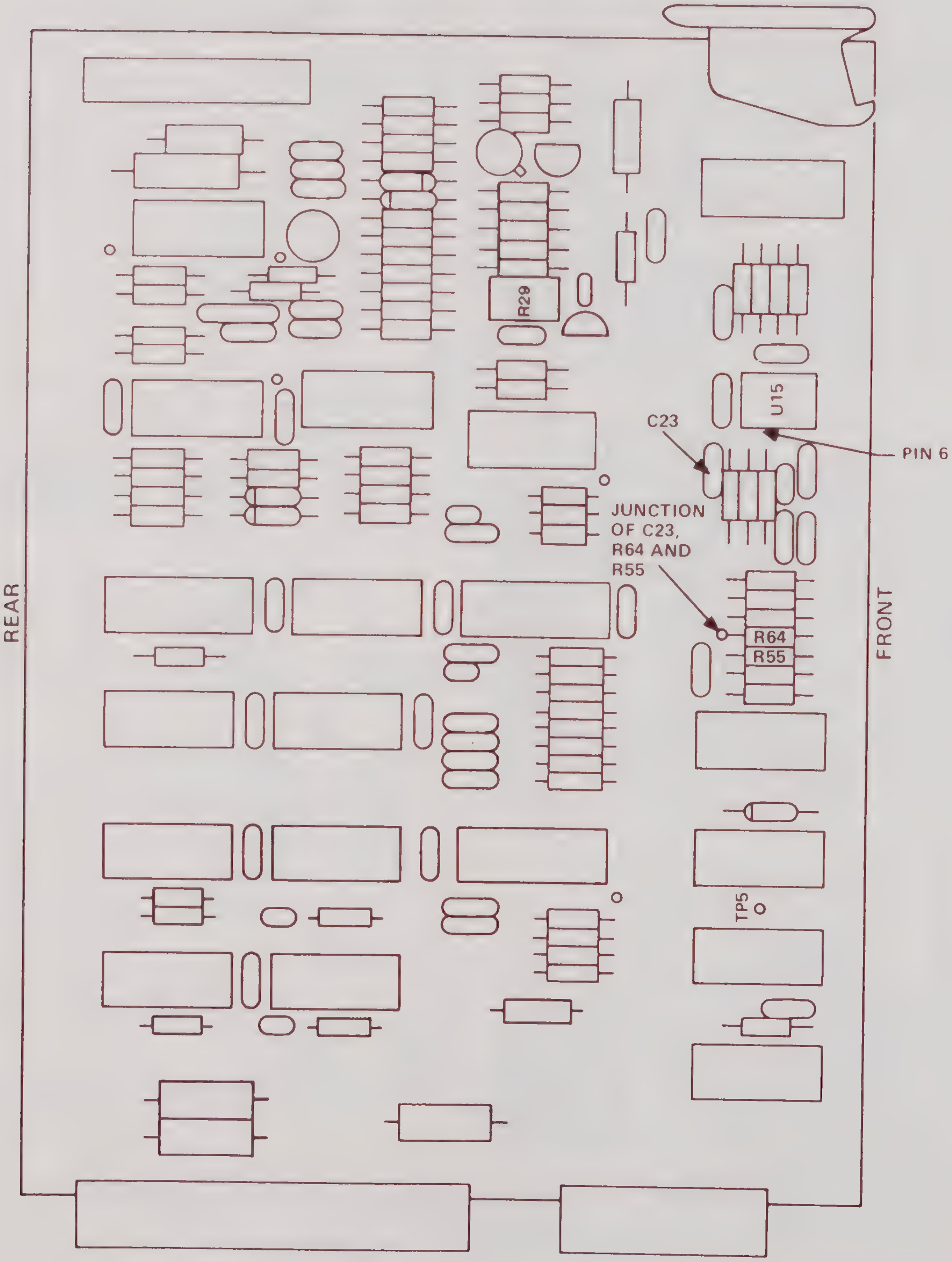
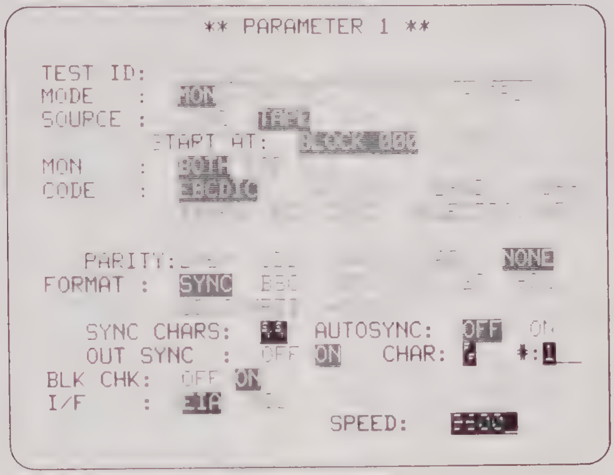


Figure K-13b Diagram of alternate Tape Servo Board.



```
                ** PARAMETER 1 **

TEST ID:
MODE    :  MON
SOURCE  :          TAPE
      START AT:   BLOCK 000
MON     :  BOTH
CODE    :  EBCDIC


   PARITY:                                NONE
FORMAT :   SYNC  BSC

   SYNC CHARS:  32   AUTOSYNC:  OFF   ON
   OUT SYNC   :  OFF  ON    CHAR: 2    #:1_
BLK CHK:   OFF  ON
I/F     :  EIA
                         SPEED:   9600_
```

Figure K-14

(10) After adjustment, press PROGRAM and RUN again to rewind the tape and recheck the reading over the length of the tape.

(11) Press PROGRAM and then power down the unit immediately to prevent overheating.

K.6.4 Read Gain Adjustment

(1) Remove the top and bottom covers (as described in Section K.4) and the tape servo board retainer (Figure K-11).

(2) Clean the tape head before performing this adjustment (refer to Appendix J).

(3) Connect the oscilloscope common ground to the chassis. Connect the oscilloscope input to the junction of R64, R55, and C23 on the tape servo board (see Figure K-13a or K-13b).

(4) Power up the unit. Press PROGRAM; then PARAMETERS and (numeral) 1.

(5) Select TAPE on the SOURCE line; then use the ENTER key to get to the SPEED line and enter (numerals) 9600. The menu should look like Figure K-14.

(6) Select a tape that is fully recorded with data (training tape). Make the proper code and format selections for the taped data on the Parameters 1 menu. Do not load the training tape program.

(7) Insert the tape in the drive and press the RUN key. While data is being read from the tape, the waveform at the junction of R64, R55, and C23 should be 7.5 +/-0.5 V peak-to-peak.

(8) If necessary, use a screwdriver to adjust R3 on the Read-Write Board (see Figure K-15) to obtain the correct waveform. The Read-Write Board is located on the bottom of the tape drive and is accessible through the chassis from the bottom of the unit.

(9) Press PROGRAM and then power down the INTERVIEW immediately.

K.6.5 Tape Hole Sensor Adjustment

NOTE: There are two types of tapes, classified by the size of the Tape Mark Sensor (TMS) hole: large hole (0.045-in. diameter) and small hole (0.023-in. diameter).

(1) Clean the tape hole sensor before performing this adjustment (refer to Appendix J).

(2) Power up the unit.

(3) Install a tape with a small TMS hole (0.023-in. diameter).

(4) Press the PROGRAM, then the LOAD PROG key to position the tape so you can locate the TMS hole on the tape.

(5) Power down the INTERVIEW.

(6) Remove the tape. Looking at the cartridge from the rear, lift the tape head door and locate the TMS hole in the tape by pushing the roller toward the door. Position the hole directly over the mirror.

(7) Repeat steps (3) through (6) with the large TMS hole (0.045-in. diameter) tape.

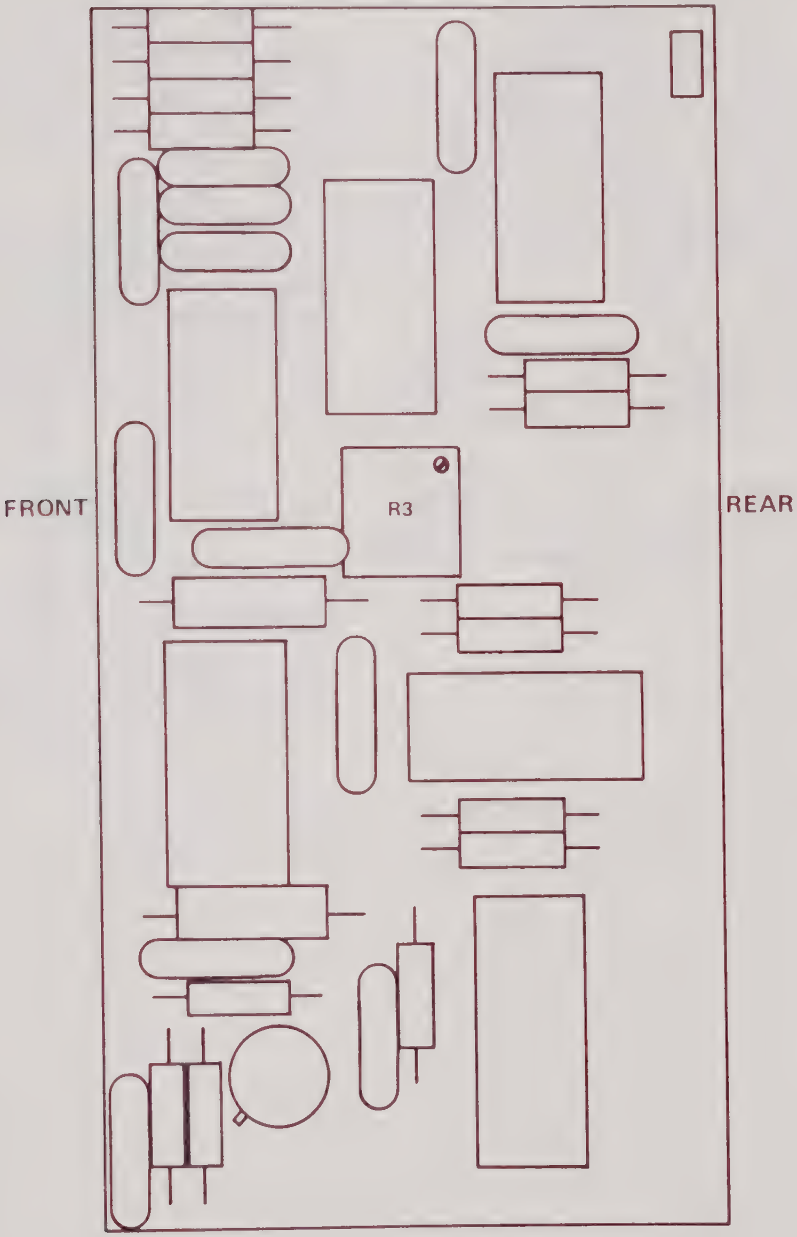


Figure K-15 Diagram of Read-Write Board viewed through chassis from under side of unit.

(8) Do not install either tape now.

(9) Remove the top and bottom covers as explained in Section K.4.

(10) Connect the oscilloscope common ground to the chassis. Connect the oscilloscope input to TP 1 on the tape status-drive board. See Figure K-16. TP 1 is accessible through cutouts in the bottom and side of the INTERVIEW chassis. This test point may be in either of two locations (see Figures K-17a and K-17b).

(11) Power up the unit. After the internal self tests are finished, reinstall the small-hole tape in the drive.

(12) Monitor TP 1 on the oscilloscope while you rotate the tape capstan with a screwdriver until a maximum peak-to-peak waveform is obtained.

CAUTION: Do not touch the tachometer disc.

(13) Adjust R11 on the status drive board for 1.5 V peak-to-peak (see Figure K-16).

(14) Remove the small-hole tape. Move the tape by hand until the hole is no longer over the mirror. If the hole is left over the mirror, the INTERVIEW will not detect the presence of the tape.

(15) Install the large-hole tape. Rotate the tape capstan until a maximum peak-to-peak waveform is obtained at TP-1. The dc offset voltage should not exceed 6 V to the center of the waveform. If the center of the waveform does exceed 6 V, adjust R11 for 6 V at TP 1.

(16) Power down the INTERVIEW immediately to prevent overheating.

(17) Remove the tape. Move the tape by hand until the hole is no longer over the mirror. If the hole is left over the mirror, the INTERVIEW will not detect the presence of the tape.

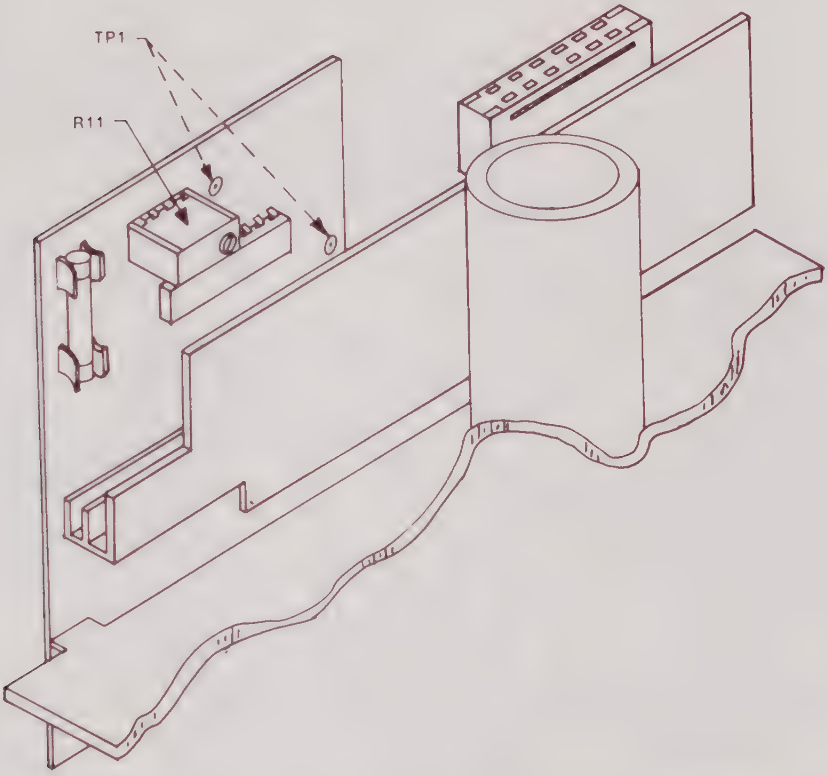


Figure K-16 Tape Status-Drive Board viewed from the under side of the chassis.

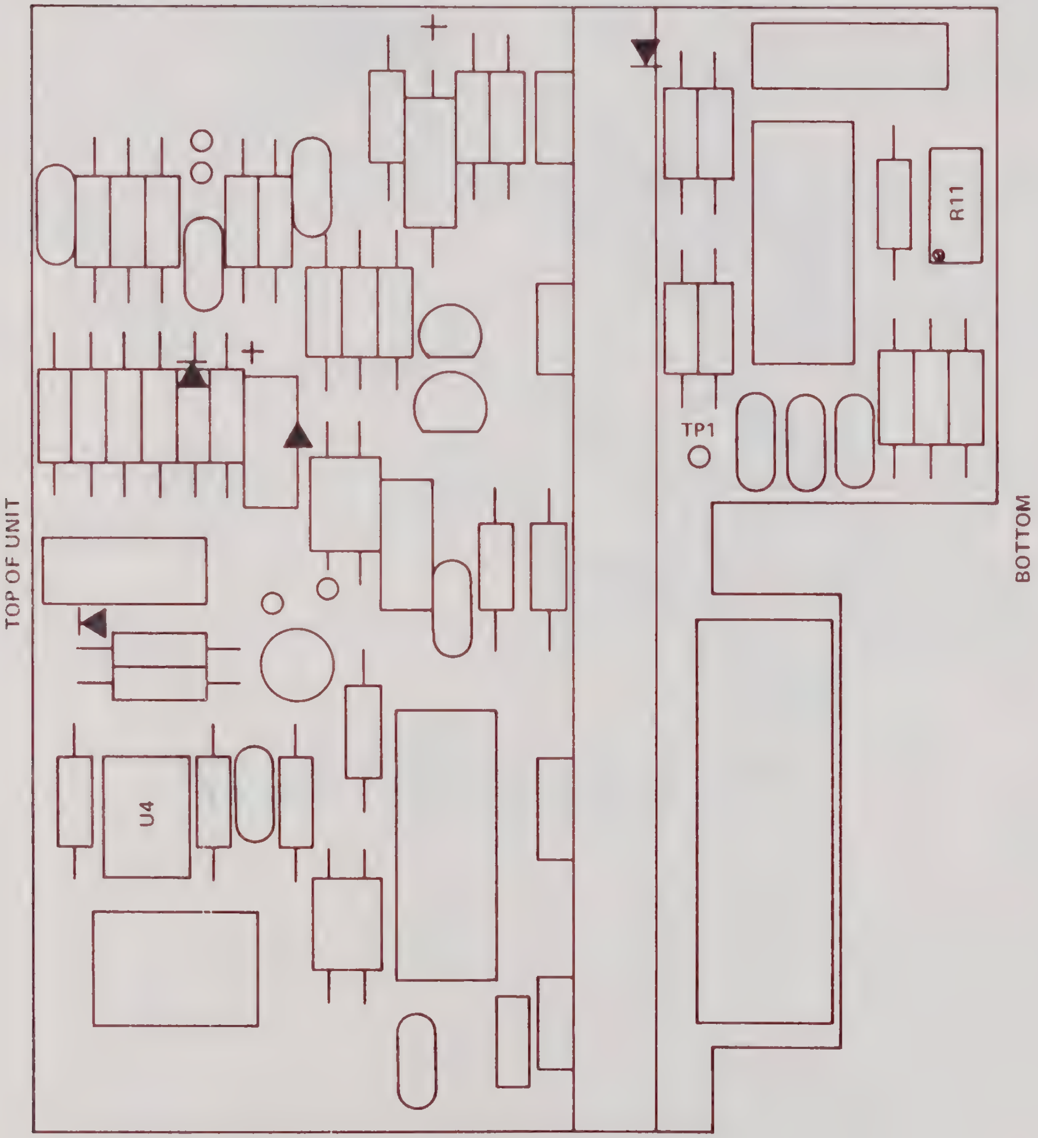


Figure K-17a Diagram of Tape Status-Drive Board.

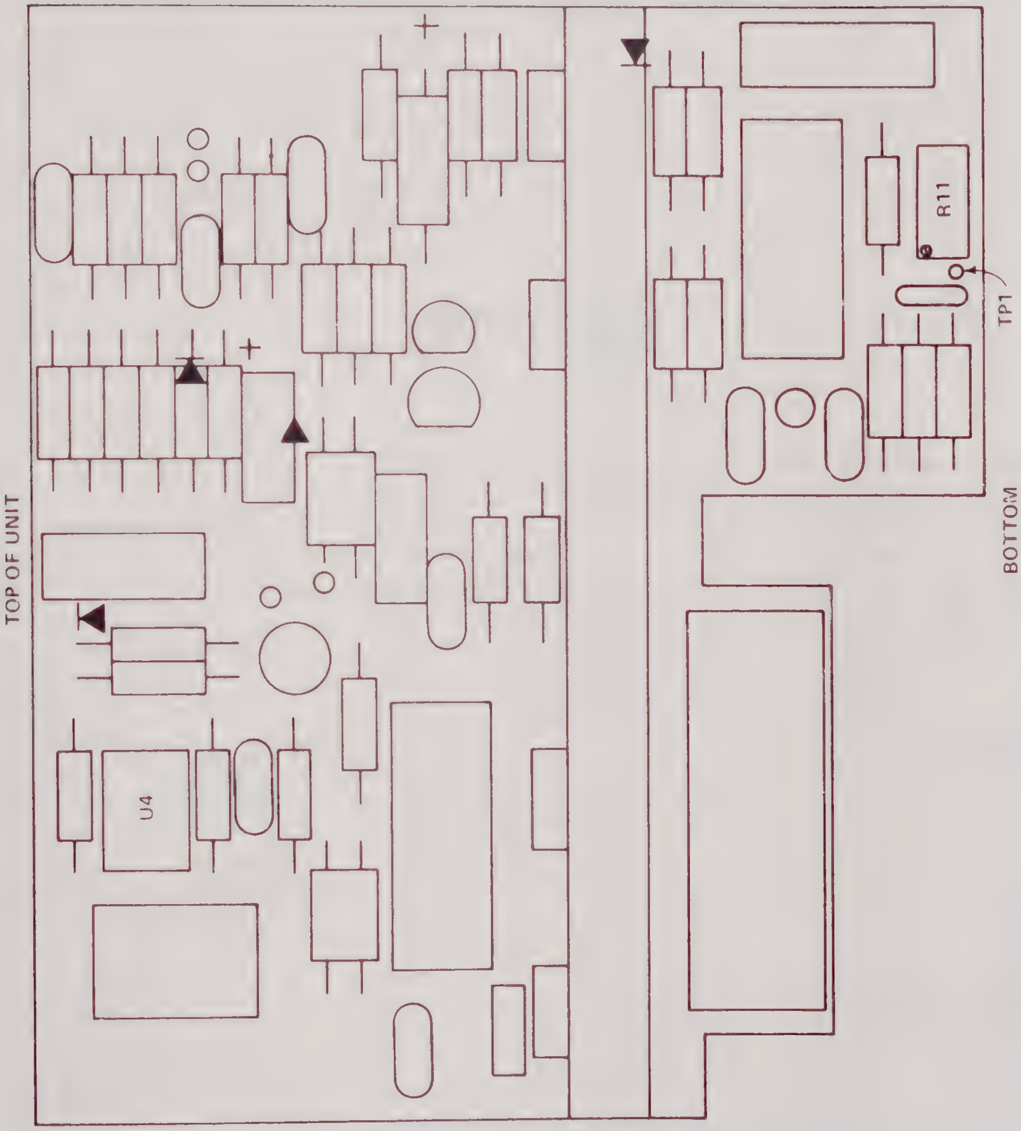


Figure K-17b Diagram of alternate Tape Status-Drive Board.

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